559.45
V661r
v.5'

1928.

VICTORIA.

DEPARTMENT OF MINES.

RECORDS

OF THE

GEOLOGICAL SURVEY OF VICTORIA.

(W. BARAGWANATH, Director.)

VOL. V. PART I.

ISSUED BY

A. H. MERRIN, M.C.E., SECRETARY FOR MINES, UNDER THE AUTHORITY OF THE HON. J. P. JONES, M.P., MINISTER OF MINES.

THE SORRENTO BORE, MORNINGTON PENINSULA,

WITH A DESCRIPTION OF

NEW OR LITTLE-KNOWN FOSSILS,

BY

FREDERICK CHAPMAN, A.L.S., F.G.S., F.R.M.S., ETC.,

PALÆONTOLOGIST TO THE NATIONAL MUSEUM, MELBOURNE; LECTURER ON PALÆONTOLOGY, MELBOURNE UNIVERSITY; HON. PALÆONTOLOGIST TO THE GEOLOGICAL SURVEY OF VICTORIA;

Assisted by IRENE CRESPIN, B.A., and ROBERT A. KEBLE, Assistant Field Geologist, Geological Survey of Victoria.

THE LIBRARY OF THE
JUN 5 1929
UNIVERSITY OF

By Authority:

H. J. GREEN, GOVERNMENT PRINTER, MELBOURNE.

5525.—PRICE 1s. 6d.

1928.

VICTORIA.

DEPARTMENT OF MINES.

RECORDS

OF THE

GEOLOGICAL SURVEY OF VICTORIA.

(W. BARAGWANATH, Director.)

VOL. V., PART I.

ISSUED BY

A. H. MERRIN, M.C.E., SECRETARY FOR MINES, UNDER THE AUTHORITY OF THE HON. J. P. JONES, M.P., MINISTER OF MINES.

THE SORRENTO BORE, MORNINGTON PENINSULA,

WITH A DESCRIPTION OF

NEW OR LITTLE-KNOWN FOSSILS,

BY

FREDERICK CHAPMAN, A.L.S., F.G.S., F.R.M.S., ETC.,

PALÆONTOLOGIST TO THE NATIONAL MUSEUM, MELBOURNE; LECTURER ON PALÆONTOLOGY, MELBOURNE UNIVERSITY; HON. PALÆONTOLOGIST TO THE GEOLOGICAL SURVEY OF VICTORIA;

Assisted by IRENE CRESPIN, B.A., and ROBERT A. KEBLE, Assistant Field Geologist, Geological Survey of Victoria.

THE LIBRARY OF THE
JUN 5 1929
UNIVERSITY OF ILLINOIS

By Authority:

H. J. GREEN, GOVERNMENT PRINTER, MELBOURNE.

5525.—PRICE 1s. 6d.

559.45
V661r
v.5'

PREFATORY NOTE.

The Sorrento Bore presents a continuous section of rocks ranging from Recent to Balcombian (Oligocene) in age; and as a result of Mr. F. Chapman's study of the cores, a laborious research extending over 10 years, it has furnished results of the highest economic and scientific value. Considerable diversity of opinion existed among geologists regarding the relative ages of certain Tertiary formations in Southern Australia, and no known section gave a complete sequence of beds. Mr. Chapman's report on the Sorrento Bore has banished all doubt on the subject, and it will provide the standard work for many years. The Tertiary formations are most important in their economic aspect. They contain the immense deposits of brown coal and lignite used by the Electricity Commission to furnish power and light to a great part of the State, the limestone used at the large cement works at Geelong, and other economic minerals not yet in use. In them are our principal underground water supplies, and they furnish a great area of soils used for agriculture and grazing. Every advance in our knowledge of these formations is of value to the State. The record of the Sorrento Bore will provide reliable data for the correlation of Tertiary strata in connexion with present and future investigations into the possibility of mineral oil occurring in the Tertiary formations of the southern portion of the Commonwealth.

W. BARAGWANATH,
Director, Geol. Survey of Victoria.

Pam 3 Ju. 9 v.5. 1928 cont + M

CONTENTS.

		Page
I.	Introduction	5
II.	Description of Bore Cores and Contents	7
III.	Descriptions of New and Rare Species	87
IV.	Classified List of Fossils with their Depths in the Bore	134
V.	Notes on the Faunas and Stratigraphic Horizons	173
VI.	Bibliography	185
VII.	Explanation of Plates	189
VIII.	Index	193

THE SORRENTO BORE, MORNINGTON PENINSULA; WITH A DESCRIPTION OF NEW OR LITTLE-KNOWN FOSSILS.

I. INTRODUCTION.

It is with a great deal of satisfaction that one is able to bring to a consummation the examination of the cores of the Sorrento Boring, of which the writer furnished a brief report and summary in 1910. (*Chapman* 1911, p. 152.)

The report is now finalized after many interruptions, and my thanks for assistance during this work are duly recorded at the end of this monograph.

The remarks which the writer made on the significance of this bore in 1910 still hold good, and are as follows:—"From a geological or stratigraphical stand-point, this boring is one of the most important ever put down in the State, for it gives the succession of the Tertiary beds in the most complete form obtainable, since in no other spot would there be such a continuous and extremely thick deposit of practically the whole of the Tertiary series."

The data there given relating to the successive horizons of the Tertiaries met with in the bore are dealt with in the summary to this report, and require very little modification.

For the data regarding the boring itself I am indebted to Mr. D. J. Mahony, M.Sc., whose information I have embodied in this note.

The boring which has furnished the material here dealt with is situated in the north-east corner of the Sorrento Recreation Reserve (Water Reserve, Allotment 6A, Parish of Nepean), and is 10 feet above sea-level by aneroid measurement.

This bore was put down by Mr. E. J. Dunn, F.G.S., then Director of the Geological Survey, to investigate the possible economic resources (brown coal, &c.) of the Tertiary formations on the down-throw side of Selwyn's fault. The operation of boring was begun on the 4th April, 1910, and was completed on 18th October, 1910. The total depth reached was 1,696 feet. The boring was stopped while still in Tertiary sediments, owing to the limit of the available plant being reached. The plant consisted of a steam-driven core drill. The cores near the surface were 5 inches in diameter, and at the bottom 3 inches. As drilling proceeded the hole was cased from the top to within a few feet of the bottom.

The samples, of which the details are given in the following monograph, are numbered from 67 to 1,693 feet; so that apparently the core from the last 3 feet was not preserved.

II. DESCRIPTION OF BORE CORES AND CONTENTS.

Depth, 67 feet.

Nature of Rock.—A loose calcareous sand.

Fossil Contents.—

Foraminifera.—

Polymorphina lactea W. & J. sp.
Globigerina bulloides d'Orb.
Truncatulina lobatula W. & J. sp.
Truncatulina ungeriana d'Orb. sp.
Polystomella crispa L. sp.

Depth, 112 feet.

Nature of Rock.—A dune-rock or consolidated calcareous sand; sometimes showing false-bedding.

Depth, 130 feet.

Nature of Rock.—As above.

Depth, 167 feet.

Nature of Rock.—As above.

Depth, 178 feet.

Nature of Rock.—As above.

Depth, 207 feet.

Nature of Rock.—Shallow water limestone, with bivalve and gasteropod shells, indet.

Depth, 226 feet.

Nature of Rock.—Consolidated dune-sand (dune-rock).

Depth, 269 feet.

Nature of Rock.—Limestone of shallow-water origin. Structure, porous, and with ferruginous staining. Some occasional mica flakes. Numerous casts of bivalves, indet.

Depth, 275 feet.

Nature of Rock.—Liver-coloured clay. Residuum after washing, a fine, ferruginous sand with a few quartz particles.

Depth, 298 feet.

Nature of Rock.—Calcareous dune-rock.

Depth, 324 feet.

Nature of Rock.—Calcareous quartzose sand and grit.

Fossil Contents.—

Foraminifera.—

Quinqueloculina sp. (fragment indet.).
Discorbina globularis d'Orb. sp.
Anomalina ammonoides Rss sp.
Pulvinulina elegans d'Orb. sp.

Polyzoa.—

Cellaria australis MacGill. (rolled and worn).

Cirripedia.—

Balanus (*Megabalanus*) *decorus* Darwin.
Balanus (*Balanus*) *amphitrite* var. *acutus* Withers.

Depth, 343 feet.

Nature of Rock.—Calcareous and quartzose sand and grit.

Fossil Contents.—

Foraminifera.—

Pulvinulina elegans d'Orb. sp.
Rotalia beccarii L. sp.

Cirripedia.—

Balanus (*Megabalanus*) *decorus* Darwin.

Depth, 388 feet.

Nature of Rock.—A fine-grained dune-rock.

Depth, 397 feet.

Nature of Rock.—A liver-coloured clay interbedded with micaceous and sandy mud.

Fossil Contents.—

Foraminifera.—

Polymorphina (?) *oblonga* d'Orb.

Polyzoa.—

Crisia sp.

Depth, 408 feet.

Nature of Rock.—Dune-rock with occasional shells.

Fossil Contents.—

Pelecypoda.—

Chlamys sp.
Ostrea sp.

Depth, 416 feet.

Nature of Rock.—Dune-rock. In thin sections, under the microscope, there are shell-fragments, polyzoa, echinoid spines and plates, and also foraminifera.

Fossil Contents.—

Foraminifera.—

Cristellaria sp.
Truncatulina sp.
Polystomella sp.

Depth, 430 feet.

Nature of Rock.—Dune-rock.

Depth, 438 feet.

Nature of Rock.—Dune-rock.

Depth, 445 feet.

Nature of Rock.—A consolidated shelly beach-sand with bivalves. The intercalated clay particles or silty layers contain foraminifera.

Fossil Contents.—

Foraminifera.—

Pulvinulina elegans d'Orb. sp.

Pelecypoda.—

Ostrea, sp.

Depth, 460 feet.

Nature of Rock.—An ochreous, sandy clay. The residuum, after washing, contains foraminifera.

Fossil Contents.—

Foraminifera.—

Truncatulina lobatula W. & J. sp.

Depth, 476 feet.

Nature of Rock.—A grey, calcareous sandstone; actually a consolidated foraminiferal sand.

Fossil Contents.—

Foraminifera.—

Triloculina tricarinata d'Orb.
Quinqueloculina bicornis W. & J. sp.
Quinqueloculina seminulum L. sp.
Quinqueloculina vulgaris d'Orb.
Lagena sulcata W. & J. sp.
Vaginulina patens Brady.
Discorbina orbicularis d'Orb. sp.
Discorbina rosacea d'Orb. sp.
Truncatulina lobatula W. & J. sp.
Truncatulina refulgens Montf. sp.
Rotalia beccarii L. sp.
Polystomella subnodosa Münster sp.
Polystomella crispa L. sp.
Polystomella macella F. & M. sp.

Ostracoda.—

Bairdia amygdaloides G. S. Brady.
Cythere demissa G. S. Brady
Cythere baragwanathi, sp. nov.
Cythere dictyon G. S. Brady.
Cythere canaliculata Rss. sp.
Cythere pumila G. S. Brady.
Xestoleberis curta G. S. Brady.
Loxoconcha avellana G. S. Brady.
Cytheropteron assimile G. S. Brady.
Cytheropteron praeantarcticum Chapman.

Depth, 489 feet.

Nature of Rock.—A dark clay with numerous bivalved shells (*Spisula*), valves of ostracoda and numerous tests of foraminifera. Of the latter, *Rotalia beccarii* is so abundant as to occupy one-third of the surface of some fragments of this clay deposit. The rock is distinctly of an estuarine nature, resembling that of a deposit forming at the present day at the mouths of some Victorian rivers. It is closely comparable, for example, with an estuarine bed which was found in excavations at Port Fairy, on the River Moyne, as seen in a Geological Survey specimen, now in the National Museum, labelled No. 47793, Port Fairy, Special Survey near River Moyne, 26.7.77. The Pleistocene clays and marls underlying the Mallee also show similar accumulations of foraminiferal shells (see Chapman, F., 1916. Rec. Geol. Surv. Vict., V. III., Pt. 4, p. 340. Depth, 138-155 ft.).

Fossil Contents.—

Foraminifera.—

Quinqueloculina seminulum L. sp.
Rotalia beccarii L. sp.
Polystomella striatopunctata F. & M.

Pelecypoda.—

Spisula trigonella Lamarck.

Gasteropoda—

? Bembicium sp. (apex).
Nassarius (*?*) *pauperatus* Lamarck sp.

Ostracoda.—

Cythere acupunctata G. S. Brady.
Cythere baragwanathi, sp. nov.

Depth, 490 feet.

Nature of Rock.—An ash-coloured clay. The residuum, after washing, is a fine white quartz sand. There are no microzoa.

Depth, 503 feet.

Nature of Rock.—Ochreous sandy clay. The residuum, after washing, consists of an angular and subangular quartz-sand, with some ochreous particles. No organisms present.

Depth, 520 feet.

Nature of Rock.—A consolidated ferruginous and calcareous sandstone, largely composed of microzoa. None determined.

Depth, 585 feet.

Nature of Rock.—Shell sand and grit, with pebbles polished by wind action. All particles, even to the microscopic shells, are polished. This seems to point to the shallow water and strand-line condition of the deposit, where the sand left at low tide would be drifted into the blown sand area beyond reach of the waves. Ostracoda should be present in a fauna such as this, but they would naturally break up and disappear sooner than the foraminiferal shells.

Fossil Contents.—

Foraminifera.—

Quinqueloculina vulgaris d'Orb.
Quinqueloculina seminulum L. sp.
Triloculina trigonula Lam. sp.
Triloculina tricarinata d'Orb.
Clavulina parisiensis d'Orb. var. *multicamerata* Chapm.
Lagena striata d'Orb.
Polymorphina elegantissima P. & J.
Globigerina bulloides d'Orb.
Discorbina obtusa d'Orb. sp.
Truncatulina mundula B.P. & J.
Truncatulina ungeriana d'Orb. sp.
Truncatulina refulgens Montf. sp.
Pulvinulina elegans d'Orb. sp.
Rotalia soldanii d'Orb.
Rotalia beccarii d'Orb. sp.
Polystomella crispa L. sp.
Polystomella macella F. & M. sp.
Polystomella subnodosa Münster.

Echinodermata.—

Echinoid test-fragments, indet.

Polyzoa.—

Selenaria marginata T. Woods.

Brachiopoda.—

Magadina compta Sow sp.

Pelecypoda.—

Glycymeris striatularis Lam. sp.
Limopsis beaumariensis Chapm.
Montacuta sericea Tate sp.
Cuna polita Tate.
Venericardia calva Tate sp.
Lucina affinis Tate.
Dosinia cf. *coerulea* Reeve.
Antigona cognata Pritch. sp.
Donax dixoni Tate.
Barnea sp. (fragment).
Corbula ephamilla Tate.

Scaphopoda.—

Dentalium sp. (fragment).

Polyplacophora.—

Acanthochitona cf. *chapmani* Ashby.

Gasteropoda.—

Gibbula sp. (fragment).
Liopyrga quadricingulata Tate.
Epitonium sp. fragment.
Polinices substolida Tate sp.
Epigrus chrysalidus Chapm. & Gabr. sp.
Nassarius crassigranosus Tate sp.
Ancilla orycta Tate sp.
Ancilla papillata Tate sp.
Conus sp. (apex).
Terebra geniculata Tate.

Ostracoda.—

Cythere acupunctata G.S.B.

Depth, 598 feet.

Nature of Rock.—A fine-grained, grey, calcareous sandstone full of minute fossil shells.

Fossil Contents.—

Foraminifera.—

Quinqueloculina agglutinans d'Orb.
Quinqueloculina contorta d'Orb.
Triloculina tricarinata d'Orb.
Spiroplecta sagittula Defr. sp.
Spiroplecta sagittula Defr. var. *fistulosa* Brady.
Polymorphina communis d'Orb.
Polymorphina lactea W. & J. sp.
Truncatulina ungeriana d'Orb. sp.
Siphonina reticulata Cz. sp.
Pulvinulina elegans d'Orb. sp.
Rotalia clathrata Brady.
Nonionina scapha F. & M. sp.
Nonionina depressula W. & J. sp.
Polystomella crispa L. sp.

Echinodermata.—

Echinoid spines (spatangoid).

Polyzoa.—

Selenaria sp.

Pelecypoda.—

Limopsis beaumariensis Chapm.
Nuculana acinaciformis Tate sp.
Cardium sp., indet.
Bassina cf. *paucirugata* Tate sp.
Zenatiopsis angustata Tate.
Mactra axiniformis Tate.

Ostracoda.—

Cythere parallelogramma G.S.B.
Cythere normani G.S.B.
Cytheropteron praeantarcticum Chapm.

Depth, 605 feet.

Nature of Rock.—A fine-grained, grey, calcareous sand-rock with shells, amongst which *Turritella tristira* is abundant.

Fossil Contents.—

Foraminifera.—

Spiroloculina dispansa Chapm.
Quinqueloculina seminulum L. sp.
Quinqueloculina vulgaris d'Orb.
Triloculina tricarinata d'Orb.
Massilina secans d'Orb. sp.
Cornuspira striolata Brady.
Cornuspira involvens Reuss sp.
Cornuspira foliacea Phil. sp.
Textularia gibbosa d'Orb.
Textularia abbreviata d'Orb.
Spiroplecta carinata d'Orb. sp.
Clavulina textularioidea Goës.
Pleurostomella subnodosa Reuss.
Lagena distoma P. & J.
Nodosaria badenensis d'Orb.
Polymorphina elegantissima P. & J.
Uvigerina pygmaea d'Orb.
Globigerina bulloides d'Orb.
Sphaeroidina bulloides d'Orb.
Truncatulina ungeriana d'Orb. sp.
Truncatulina lobatula W. & J. sp.
Anomalina ammonoides Reuss sp.
Pulvinulina haueri d'Orb. sp.
Rotalia clathrata Brady.

Anthozoa.—

Flabellum curtum Denn.
Bathyactis beaumariensis Denn.
Bathyactis lens Duncan sp.
Deltocyathus verconis Denn.
Notophyllia (?) *variolaris* T. Woods sp.
Graphularia kalimnae, sp. nov.
Spicule of a ceratosoid alcyonarian.

Polyzoa.—

Cellaria australis MacG.
Melicerita acutimarginata MacG.
Lunulites canaliculata MacG.
Selenaria marginata T. Woods.
Selenaria marginata T. Woods var. *pulchella* MacG.
Selenaria concinna T. Woods.
Selenaria cupola T.W. sp.
Cellepora fossa Hasw.
Bipora philippinensis Busk sp.

Brachiopoda.—

Magadina compta Sow. sp.
Magadinella woodsiana Tate sp.

Pelecypoda.—

Glycymeris convexus Tate sp.
Limopsis beaumariensis Chapm.
Nuculana woodsi Tate sp.
Nuculana praelonga Tate.
Nuculana chapmani Finlay.
Nuculana vagans Tate sp.
Propeleda ensicula Angas sp.
Lissarca rubricata Tate sp.
Neotrigonia acuticostata McCoy sp.
Anomia tatei Chapm. and Singl.
cf. *Cuspidaria vellicata,* sp. nov.
Erycina micans Tate sp.
Venericardia spinulosa Tate sp.
Venericardia subcompacta, sp. nov.
Venericardia calva Tate sp.
Lucina affinis Tate.
Lucina nuciformis Tate.
Myodora sp. indet.
Dosinia johnstoni Tate.
Clausinella subroborata Tate sp.
Antigona cognata Pritchard sp. (juv.).
Macrocallista submultistriata Tate sp.
Katelysia multistrigosa, sp. nov.
Corbula pyxidata Tate.

Scaphopoda.—

Dentalium lacteolum Tate.
Dentalium aratum Tate.

Gasteropoda.—

Gibbula sp. indet.
Calyptraea crassa Tate.
Ringicula tenuilirata Cossm.
Natica perspectiva Tate.
Epitonium lamprum Tate sp.
Turritella tristira Tate.
Turritella platyspira T.W.
Cylichnella sp. indet.

Ostracoda.—

Macrocypris decora G.S.B.
Aglaia clavata G.S.B.
Bairdia australis Chapm.
Bairdia amygdaloides G.S.B.
Cythere canaliculata Rss. sp.
Cythere dictyon G.S.B.
Cythere militaris G.S.B. sp.
Cythere caudispinosa, sp. nov.
Cythere quadriaculeata G.S.B.
Krithe producta G.S.B.

Xestoleberis variegata G.S.B.
Loxoconcha avellana G.S.B.
Bythocythere arenacea G.S.B.
Cytherella punctata G.S.B.
Cytherella truncata G.S.B.
Cytherella pulchra G.S.B.
Cytherella auricula Chapm.

Pisces.—

Otoliths of teleostean fishes.

Depth, 618 feet.

Nature of Rock.—A calcareous sand-rock of a greenish tint, with numerous remains of *Turritella.*

Fossil Contents.—

Foraminifera.—

Quinqueloculina vulgaris d'Orb.
Quinqueloculina seminulum L. sp.
Truncatulina ungeriana d'Orb. sp.
Truncatulina refulgens Montf. sp.
Anomalina ammonoides Rss. sp.
Rotalia clathrata Brady.
Polystomella crispa L. sp.

Polyzoa.—

Selenaria cupola T.W. sp.
Selenaria marginata T.W.
Smittina cf. *modesta* MacG. sp.

Brachiopoda.—

Terebratella planidorsata sp. nov.
Murravia catinuliformis Tate sp.

Pelecypoda.—

Nuculana miliacea Hedley sp.
Nuculana chapmani Finlay.
Nuculana woodsi Tate sp.
Arca (Barbatia) microïndula, sp. nov.
Glycymeris halli Pritch.
Limopsis beaumariensis Chapm.
Chlamys foulcheri T.W. sp.
Spondylus cf. *pseudoradula* McCoy (juv.).
Myodora brevis Sow.
Venericardia spinulosa Tate sp.
Venericardia solida Tate sp.
Venericardia calva Tate sp.
Venericardia delicatula Tate sp.
Venericardia subcompacta, sp. nov.
Lucina nuciformis Tate.
Clausinella subroborata Tate sp.
Antigona dennanti sp. nov.
Corbula pyxidata Tate.

Scaphopoda.—

Dentalium subfissura Tate.

Gasteropoda.—

Turritella tristira Tate.
Turritella platyspira T.W.

Depth, 623 feet.

Nature of Rock.—A grey calcareous sand-rock with rich shell-layers. (*Limopsis beaumariensis* and *Turritella tristira.*)

Fossil Contents.—

Foraminifera.—

Quinqueloculina oblonga Montf. sp.
Quinqueloculina vulgaris d'Orb.
Triloculina circularis Born.
Triloculina tricarinata d'Orb.
Sigmoïlina sigmoidea Brady sp.
Cornuspira striolata Brady.
Spiroplecta gramen d'Orb. sp.
Spiroplecta carinata d'Orb. sp.
Lagena hexagona Williamson sp.
Pullenia quinqueloba Rss. sp.
Discorbina rugosa d'Orb. sp.
Discorbina bertheloti d'Orb. sp.
Discorbina vilardeboana d'Orb. sp.
Truncatulina akneriana d'Orb. sp.
Truncatulina ungeriana d'Orb. sp.
Truncatulina mundula B. P. & J.
Pulvinulina repanda F. & M. sp.
Rotalia clathrata Brady.
Rotalia beccarii L. sp.
Nonionina boueana d'Orb.
Polystomella striatopunctata F. & M. sp. var. *evoluta* Chapm.
Polystomella crispa L. sp.

Anthozoa.—

Sphenotrochus emarciatus Duncan.
Notophyllia variolaris T.W. sp.
Bathyactis beaumariensis Denn.
Mopsea sp. indet.

Echinodermata.—

Pentagonaster sp. indet.

Polyzoa.—

Cellaria rigida MacG.
Cellaria australis MacG.
Lunulites canaliculata T.W. sp.
Lunulites rutella T.W. sp.
Selenaria cupola T.W. sp.
Selenaria marginata T.W. var. *pulchella* MacG.

Brachiopoda.—

Malleia planidorsata sp. nov.

Pelecypoda.—

Nuculana woodsi Tate sp.
Nuculana crebrecostata T.W. sp.
Limopsis morningtonensis Pritch.
Limopsis beaumariensis Chapm.
Arca (Barbatia) microïndula, sp. nov.
Glycymeris planiuscula Chapm. and Singl.
Glycymeris halli Pritch.
Lima (Limatula) jeffreysiana Tate sp.
Venericardia pecten Tate sp.
Venericardia spinulosa Tate sp.
Venericardia calva Tate sp.
Cardita sorrentae, sp. nov.
Crassatellites communis Tate sp.
Antigona dennanti, sp. nov.
Corbula ephamilla Tate.
Corbula pyxidata Tate.
Panope cf. *orbita* Hutton sp.

Scaphopoda.—

Dentalium aratum Tate.
Dentalium latesulcatum Tate.

Gasteropoda.—

Liotina roblini T.W. sp. (juv.).
Eglisia triplicata T.W. sp.
Epigrus chrysalidus Chapm. and Gabr. sp.
Rissoina stevensiana T.W. sp.
Turritella acricula Tate.
Turritella tristira Tate.
Turritella sturtii Tate.
Turritella platyspira T.W.
Turritella murrayana Tate.
Turritella multicincturalis, sp. nov.
Bittium turritelliforme Angas sp.

Cirripedia.—

Balanus (Megabalanus) cf. *psittacus* Molina sp.

Ostracoda.—

Bairdia amygdaloides G.S.B.
Cythere obtusalata G.S.B.
Cythere dictyon G.S.B.
Loxoconcha australis G.S.B.
Loxoconcha alata G.S.B.
Bythocythere keblei, sp. nov.
Cytheropteron wellingtoniense G.S.B.
Cytherella pulchra G.S.B.
Cytherella punctata G.S.B.

Depth, 628 feet.

Nature of Rock.—Greenish sand-rock with numerous shells, indet.

Depth, 630 feet.

Nature of Rock.—Greenish sand-rock with shells. *Limopsis beaumariensis* and *Turritella tristira* abundant.

Fossil Contents.—

Foraminifera.—

Biloculina bulloides d'Orb.
Spiroloculina asperula Karr.
Spiroloculina dispansa, sp. nov.
Quinqueloculina vulgaris d'Orb.
Cornuspira striolata Brady.
Textularia abbreviata d'Orb.
Spiroplecta sagittula Defr. sp.
Nodosaria (D.) obliqua L. sp.
Orbulina universa d'Orb.
Globigerina bulloides d'Orb.
Truncatulina lobatula W. & J. sp.
Truncatulina wuellerstorfi Schw. sp.
Truncatulina mundula B.P. & J.
Pulvinulina punctulata d'Orb sp.
Polystomella macella F. & M. sp.

Anthozoa.—

Sphenotrochus alatus T.W.
Deltocyathus verconis Denn.
Mopsea sp. (joints) indet.

Echinodermata.—

Echinoid spine, indet.
Pentagonaster sp. indet. (marginal plate).

Vermes.—

Ditrupa cf. *cornea* L. (var. indet.)

Polyzoa.—

Cellaria rigida MacG. var. *perampla* Waters.
Melicerita angustiloba Busk.
Selenaria marginata T.W.
Selenaria marginata var. *spiralis* Chapm.
Selenaria marginata var. *lucens* MacG.
Selenaria cupola T.W. sp.
Lunulites canaliculata T.W. sp.
Bipora philippinensis Busk sp.

Pelecypoda.—

Nucula morundiana Tate.
Nuculana miliacea Hedley sp.
Nuculana chapmani Finlay.
Nuculana fontinalis Pritch. sp.
Nuculana acuticauda Pr. sp.
Limopsis beaumariensis Chapm.
Chlamys antiaustralis Tate sp.
Spondylus sp. indet. (juv.)
Cuna polita Tate sp.
Erycina micans Tate sp.
Venericardia calva Tate sp.
Venericardia spinulosa Tate sp.
Myodora tenuilirata Tate.
Corbula coxi Pilsbry.

Scaphopoda.—

Dentalium aratum Tate.

Gasteropoda.—

Calyptraea kalimnae Chapm. & Gabr
Pyramidella polita Johnston.
Pyramidella jonesiana Tate sp.
Rissoina stevensiana T.W. sp.
Turritella tristira Tate.
Turritella acricula Tate.

Ostracoda.—

Macrocypris maculata G.S.B.
Bairdia australis Chapm.
Cythere dictyon G.S.B.
Cythere parallelogramma G.S.B.
Cythere scabrocuneata G.S.B.
Loxoconcha australis G.S.B.
Cytherella pulchra G.S.B.
Cytherella (?) punctata G.S.B.

Pisces.—

Otolith of fish, indet.

Depth, 640 feet.

Nature of Rock.—Greenish sand-rock with shells. *Turritella tristira,* common.

Fossil Contents.—

Foraminifera.—

Biloculina sarsi Schl.
Spiroloculina asperula Karr.
Spiroloculina dispansa, sp. nov.
Quinqueloculina vulgaris d'Orb.
Cornuspira striolata Brady.
Spiroplecta carinata d'Orb sp.
Spiroplecta gramen d'Orb.
Clavulina textularioidea Goës.
Lagena gracillima Seg. sp.
Nodosaria (D.) consobrina var. *emaciata* Rss.
Cristellaria cultrata Montf. sp.
Sphaeroidina bulloides d'Orb.
Discorbina parisiensis d'Orb. sp.
Truncatulina ungeriana d'Orb. sp.
Truncatulina lobatula W. & J. sp.
Truncatulina akneriana d'Orb. sp.
Pulvinulina karsteni Rss. sp.
Polystomella subnodosa Münst. sp.

Vermes.—

Ditrupa cornea L. sp. var. *wormbetiensis* McCoy.

Polyzoa.—

Cellaria rigida MacG. var. *perampla* Waters.
Cellaria contigua MacG.
Selenaria marginata T.W.
Selenaria cupola T.W.
Lekythopora hystrix MacG.
Bipora philippinensis Busk sp.

Pelecypoda.—

Nuculana chapmani Finlay.
Nuculana praelonga Tate sp.
Limopsis maccoyi Chapm. (juv.).
Lissarca rubricata Tate sp.
Neotrigonia lamarcki Gray sp.
Venericardia calva Tate sp.
Venericardia spinulosa Tate sp.

Scaphopoda.—

Dentalium aratum Tate.

Gasteropoda.—

Calyptraea kalimnae Chapm. & Gabr.
Natica hamiltonensis Tate.
Epitonium pleiophyllum Tate sp.
Turritella tristira Tate.
Turritella acricula Tate.

Ostracoda.—

Bairdia australis Chapm.
Cythere quadriaculeata G.S.B.
Cythere parallelogramma G.S.B.
Cythere caudispinosa, sp. nov.
Cytherella auricula Chapm.
Cytherella polita G.S.B.
Cytherella pulchra G.S.B.
Cytherella punctata G.S.B.

Depth, 654 feet.

Nature of Rock.—Greenish sand-rock, with a few shells.

Fossil Contents.—

Foraminifera.—

Quinqueloculina vulgaris d'Orb.
Quinqueloculina agglutinans d'Orb.
Cornuspira crassisepta Brady.
Bolivina punctata d'Orb.
Truncatulina ungeriana d'Orb. sp.
Truncatulina mundula B. P. & J.
Truncatulina akneriana d'Orb. sp.
Rotalia clathrata Brady.

Anthozoa.—

Sphenotrochus alatus T.W.
Trematotrochus fenestratus T.W.
Notophyllia variolaris T.W. sp.

Echinodermata.—

Cidaroid spine, indet.

Polyzoa.—

Melicerita acutimarginata MacG. sp.
Cellaria contigua MacG.
Cellaria australis MacG.

Brachiopoda.—

Terebratula aldingae Tate.

Pelecypoda.—

Nuculana chapmani Finlay.
Neotrigonia acuticostata McCoy sp.
Chlamys sp. nov. aff. *sturtiana* Tate sp.
Dimya dissimilis Tate.
Venericardia spinulosa Tate sp.
Venericardia calva Tate sp.
Corbula pyxidata Tate.

Gasteropoda.—

Turritella tristira Tate.

Ostracoda.—

Aglaia clavata G.S.B.
Bairdia australis Chapm.
Cythere quadriaculeata G.S.B.
Cythere scintillulata G.S.B.
Cytherella pulchra G.S.B.
Cytherella punctata G.S.B.

Pisces.—

Otoliths of teleostean fishes.

Depth, 660 feet.

Nature of Rock.—Greenish, calcareous sand-rock, with shells.

Fossil Contents.—

Foraminifera.—

Biloculina bulloides d'Orb.
Spiroloculina dispansa Chapm.
Quinqueloculina vulgaris d'Orb.
Cornuspira foliacea Phil. sp.
Lagena hispida Rss.
Discorbina pileolus d'Orb. sp.
Truncatulina ungeriana d'Orb. sp.
Truncatulina mundula B.P. & J.
Rotalia clathrata Brady.
Nonionina boueana d'Orb.

Anthozoa.—

Bathyactis beaumariensis Denn.
Trematotrochus fenestratus T.W.

Echinodermata.—

Pentagonaster sp. (ossicles).

Polyzoa.—

Melicerita acutimarginata MacG. sp.
Cellaria australis MacG.
Cellaria contigua MacG.
Cellaria rigida, var. *perampla* MacG.
Selenaria marginata T.W.
Selenaria maculata Busk.
Retepora lineata MacG.

Brachiopoda.—

Cryptopora acutirostra Chapm. sp.
Magadinella woodsiana Tate sp.

Pelecypoda.—

Nucula fenestralis Tate.
Nuculana woodsi Tate sp.
Nuculana crebrecostata T.W. sp.
Limopsis beaumariensis Chapm.
Arca (*Barbatia*) *microündula,* sp. nov.
Glycymeris halli Pritch.
Lissarca rubricata Tate sp.
Chlamys antiaustralis Tate sp.
Limaea transenna Tate.
Cuna sp.
Venericardia spinulosa Tate sp.
Venericardia calva Tate sp.
Lucina sp. indet. (juv.).
Erycina micans Tate sp.
Clausinella subroborata Tate sp.
Antigona dennanti, sp. nov.

Scaphopoda.—

Dentalium aratum Tate.
Dentalium subfissura Tate.

Gasteropoda.—

Calyptraea kalimnae Chapm. & Gabr.
Epitonium gonioides Tate sp.
Turritella tristira Tate.
Ringicula tatei Cossm.

Cephalopoda.—

Aturia australis McCoy.

Ostracoda.—

Cythere dictyon G.S.B.
Cythere canaliculata Reuss sp.

Pisces.—

Fish vertebrae indet.

Depth, 661 feet.

Nature of Rock.—Calcareous sand-rock with numerous large shells of *Turritella tristira.*

Fossil Content.—

Foraminifera.—

Spiroloculina dispansa, sp. nov.
Quinqueloculina ferussacii d'Orb.
Quinqueloculina vulgaris d'Orb.
Truncatulina ungeriana d'Orb. sp.
Truncatulina mundula, B.P. & J.
Truncatulina akneriana d'Orb sp:
Pulvinulina elegans d'Orb. sp.
Rotalia clathrata Brady.

Anthozoa.—

Graphularia kalimnae, sp. nov.

Polyzoa.—

Selenaria maculata Busk.

Pelecypoda.—

Limopsis beaumariensis Chapm.
Chlamys antiaustralis Tate sp.
Venericardia subcompacta, sp. nov.
Lucina nuciformis Tate.
Callanaitis cainozoica T.W. sp.
Corbula pyxidata Tate.

Scaphopoda.—

Dentalium mantelli Zittel.
Dentalium aratum Tate.

Gasteropoda.—

Teinostoma calva, sp. nov.
Calyptraea kalimnae Chapm. & Gabr.
Rissoina stevensiana T.W. sp.
Turritella platyspira T.W.
Turritella acricula Tate.
Triforis wilkinsoni T.W.

Cirripedia.—

Scalpellum (*Arcoscalpellum*) *dunni,* sp. nov. (Carina).

Ostracoda.—

Cytherella pulchra G.S.B.
Cytherella punctata G.S.B.
Cytherella subtruncata Chapm.

Depth, 670 feet.

Nature of Rock.—Greenish sand-rock, with small shells (*Venericardia*).

Fossil Contents.—

Foraminifera.—

Biloculina ringens Lam.
Quinqueloculina vulgaris d'Orb.
Triloculina oblonga Mont. sp.
Polymorphina elegantissima P. & J.
Globigerina bulloides d'Orb.
Discorbina bertheloti d'Orb. sp.
Truncatulina akneriana d'Orb. sp.
Truncatulina ungeriana d'Orb. sp.

Truncatulina mundula B.P. & J.
Rotalia clathrata Brady.
Polystomella crispa L. sp.

Anthozoa.—
Placotrochus deltoideus Dunc.
Sphenotrochus emarciatus Dunc.
Bathyactis beaumariensis Denn.
Notophyllia variolaris T.W.

Vermes.—
Ditrupa cornea L. sp. var. *wormbetiensis* McCoy.

Polyzoa.—
Melicerita acutimarginata MacG. sp.
Lunulites rutella T.W.
Lunulites canaliculata MacG.
Selenaria marginata T.W.

Echinodermata.—
Pentagonaster sp. indet. (ossicles).

Brachiopoda.—
Murravia catinuliformis Tate sp.

Pelecypoda.—
Nucula obliqua Lam.
Nuculana woodsi Tate sp.
Nuculana vagans Tate sp.
Nuculana crebrecostata T.W. sp.
Sarepta obolella Tate sp.
Limopsis beaumariensis Chapm.
Arca (*Barbatia*) *dissimulina*, sp. nov.
Lissarca rubricata Tate sp.
Neotrigonia acuticostata McCoy sp.
Spondylus cf. *pseudoradula* McCoy (juv.).
Anomia tatei Chapm. and Singl.
Myodora gabrieli, sp. nov.
Crassatellites communis Tate sp.
Venericardia delicatula Tate sp.
Venericardia calva Tate sp.
Venericardia trigonalis Tate sp.
Clausinella subroborata Tate sp.
Zenatiopsis angustata Tate.

Scaphopoda.—
Dentalium aratum Tate.

Gasteropoda.—
Solariella strigata T.W.
Pyramidella jonesiana Tate.
Turbonilla radicans, sp. nov.
Calyptraea kalimnae Chapm. & Gabr.
Natica polita T.W.
Natica hamiltonensis Tate.
Turritella platyspira T.W.
Marginella wentworthi T.W.
Ancilla ligata Tate sp.
Olivella nymphalis Tate sp.
Terebra profunda Chapm. & Gabr.

Ostracoda.—

Bairdia australis Chapm.
Cythere caudispinosa, sp. nov.
Loxoconcha avellana G.S.B. var. *polita,* nov.
Loxoconcha australis G.S.B.
Cytheropteron praeantarcticum Chapm.
Cytherella pulchra G.S.B.

Depth, 674 feet.

Nature of Rock.—Grey shell marl with thick bands of mollusca (*Zenatiopsis* and *Turritella*).

Fossil Contents.—

Foraminifera.—

Triloculina tricarinata d'Orb.
Quinqueloculina seminulum L. sp.
Lagena aspera Rss.
Discorbina turbo d'Orb. sp.
Truncatulina ungeriana d'Orb. sp.
Truncatulina mundula B.P. & J.
Pulvinulina schreibersii d'Orb.
Nonionina depressula W. & J. sp.
Polystomella crispa L. sp.

Anthozoa.—

Placotrochus deltoideus Dunc.
Sphenotrochus emarciatus Dunc.
Bathyactis beaumariensis Denn.
Notophyllia variolaris Denn.
Graphularia kalimnae, sp. nov.

Vermes.—

Ditrupa cornea L. sp. var. *wormbetiensis* McCoy.

Polyzoa.—

Cellaria australis MacG.
Lunulites rutella T.W.
Selenaria marginata T.W.
Selenaria marginata var. *lucens* MacG.

Brachiopoda.—

Murravia catinuliformis Tate sp.
Magadina compta Sow. sp.

Pelecypoda.—

Nuculana miliacea Hedley sp.
Arca (*Barbatia*) *dissimulina,* sp. nov.
Glycymeris planiuscula Chapm. and Singl.
Limopsis beaumariensis Chapm.
Chlamys antiaustralis Tate sp.
Venericardia delicatula Tate sp.
Venericardia calva Tate sp.
Venericardia spinulosa Tate sp.
Venericardia archaenepeanensis, sp. nov.
Antigona dennanti, sp. nov.
Katelysia strigosa Lam. sp.
Corbula pyxidata Tate.

Scaphopoda.—
Dentalium cf. *largicrescens* Tate.
Dentalium aratum Tate.
Dentalium latesulcatum Tate.

Gasteropoda.—
Epigrus chrysalidus Chapm. and Gabr. sp.
Epitonium pleiophyllum Tate sp.
Polinices substolida Tate sp.
Turritella tristira Tate.
Turritella acricula Tate.
Turritella platyspira T. W.

Ostracoda.—
Bairdia amygdaloides G.S.B.
Cythere canaliculata G.S.B.
Cytherura lilljeborgii G.S.B.
Cytheropteron praeantarcticum Chapm.
Cytherella pulchra G.S.B.

Depth, 684 feet.

Nature of Rock.—Grey calcareous sand-rock, with a few badly preserved shells.

Fossil Contents.—

Foraminifera.—
Quinqueloculina vulgaris d'Orb.
Cassidulina subglobosa Brady.
Truncatulina lobatula W. & J. sp.
Truncatulina ungeriana d'Orb. sp.
Anomalina ammonoides Rss. sp.
Pulvinulina auricula F. & M. sp.

Pelecypoda.—
Chlamys sp.
Dimya dissimilis Tate.

Ostracoda.—
Argilloecia badia G.S.B.
Cythere dictyon G.S.B.
Cythere polytrema G.S.B.
Cytherella pulchra G.S.B.
Cytherella auricula Chapm.

Depth, 690 feet.

Nature of Rock.—Greenish calcareous sand-rock, with shells (*Turritella*).

Fossil Contents.—

Foraminifera.—
Spiroloculina dispansa, sp. nov.
Triloculina tricarinata d'Orb.
Triloculina trigonula Lam. sp.
Quinqueloculina lamarckiana d'Orb.
Quinqueloculina subrotunda Mont. sp.

Cornuspira involvens Rss. sp.
Spiroplecta carinata d'Orb. sp.
Lagena squamosa Mont. sp.
Nodosaria (*G.*) *laevigata* Rss.
Discorbina globularis d'Orb. sp.
Discorbina bertheloti d'Orb. sp.
Truncatulina ungeriana d'Orb. sp.
Truncatulina mundula B.P. & J.
Anomalina ammonoides Rss. sp.

Pelecypoda.—
Nuculana chapmani Finlay.
Venericardia calva Tate sp.

Ostracoda.—
Cythere obtusalata G.S.B.
Bairdia australis Chapm.
Krithe eggeri Chapm.
Loxoconcha australis G.S.B.

Depth, 694 feet.

Nature of Rock.—Greenish calcareous sand-rock, with shells (*Turritella*).

Fossil Contents.—

Foraminifera.—
Biloculina bulloides d'Orb.
Triloculina trigonula Lam. sp.
Quinqueloculina tricarinata d'Orb.
Quinqueloculina seminulum L. sp.
Quinqueloculina linnaeana d'Orb. sp.
Quinqueloculina polygona d'Orb.
Quinqueloculina schreiberiana d'Orb.
Quinqueloculina lamarckiana d'Orb.
Quinqueloculina vulgaris d'Orb.
Sigmoïlina celata Costa sp.
Cornuspira striolata Brady.
Cornuspira foliacea Phil. sp.
Spiroplecta carinata d'Orb sp.
Gaudryina rugosa d'Orb.
Nodosaria (*D.*) *soluta* Rss.
Polymorphina regina B.P. & J.
Polymorphina compressa d'Orb.
Polymorphina elegantissima P. & J.
Sphaeroidina bulloides d'Orb.
Discorbina bertheloti d'Orb. sp.
Truncatulina ungeriana d'Orb. sp.
Truncatulina mundula B.P. & J.

Polyzoa.—
Lunulites canaliculata MacG.
Selenaria marginata T.W.
Selenaria marginata var. *lucens* MacG.
Selenaria cupola T.W. sp.
Bipora cancellata Busk sp.

Pelecypoda.—
Nucula semistriata Tate.
Nuculana miliacea Hedley sp.
Nuculana vagans Tate sp.
Nuculana woodsi Tate sp.
Nuculana acuticauda Pritch. sp.
Propeleda huttoni T.W. sp.
Limopsis beaumariensis Chapm.
Chlamys antiaustralis Tate sp.
Anomia tatei Chapm. and Singl.
Myodora gabrieli, sp. nov.
Crassatellites aff. *abbreviata* Tate sp.
Venericardia spinulosa Tate sp.
Venericardia calva Tate sp.
Venericardia subcompacta, sp. nov.
Antigona dennanti, sp. nov.
Zenatiopsis angustata Tate.

Scaphopoda.—
Dentalium aratum Tate.

Gasteropoda.—
Pyramidella jonesiana Tate.
Rissoina lintea Hedley & May.
Polinices substolida Tate sp.
Turritella acricula Tate.
Turritella tristira Tate.
Ringicula tatei Cossm.

Ostracoda.—
Macrocypris tumida G.S.B.
Bairdia australis Chapm.
Cythere parallelogramma G.S.B.
Cythere normani G.S.B.
Cytherella punctata G.S.B.
Cytherella pulchra G.S.B.

Depth, 700 feet.

Nature of Rock.—Greenish calcareous sand-rock, with few organic remains.

Fossil Contents.—

Foraminifera.—
Quinqueloculina vulgaris d'Orb.
Quinqueloculina schreiberiana d'Orb.
Triloculina trigonula Lam. sp.

Pelecypoda.—
Limopsis beaumariensis Chapm.
Dimya dissimilis Tate.

Ostracoda.—
Bairdia australis Chapm.

Depth, 719 feet.

Nature of Rock.—Grey, incoherent sand-rock.

Fossil Contents.—

Foraminifera.—
Spiroloculina dispansa, sp. nov.
Triloculina tricarinata d'Orb.

Quinqueloculina vulgaris d'Orb.
Polymorphina oblonga d'Orb.
Discorbina dimidiata P. & J.
Truncatulina ungeriana d'Orb. sp.
Truncatulina mundula B.P. & J.
Polystomella crispa L. sp.

Anthozoa.—
Placotrochus deltoideus Dunc.
Flabellum victoriae Dunc.
Flabellum gippslandicum Denn.
Deltocyathus verconis Denn.
Notophyllia variolaris T.W. sp.

Vermes.—
Ditrupa cornea L. sp. var. *wormbetiensis* McCoy.

Polyzoa.—
Melicerita acutimarginta MacG. sp.
Cellaria australis MacG.
Cellaria rigida MacG.
Cellaria rigida var. *perampla* Waters.
Lunulites canaliculata MacG.
Selenaria marginata T.W.
Bipora philippinensis Busk sp.

Brachiopoda.—
Murravia catinuliformis Tate sp.

Pelecypoda.—
Nucula morundiana Tate.
Nuculana woodsi Tate sp.
Nuculana crebrecostata T.W. sp.
Limopsis affinitalis, sp. nov.
Neotrigonia lamarcki Gray sp.
Myodora gabrieli, sp. nov.
Cardita sorrentae, sp. nov.
Venericardia compacta Tate sp.
Venericardia scabrosa Tate sp.
Venericardia calva Tate sp.
Clausinella subroborata Tate sp.
Corbula coxi Pilsbry.

Scaphopoda.—
Dentalium semiaratum, sp. nov.

Gasteropoda.—
Turbonilla liraecostata T.W.
Epitonium pachypleura Tate sp.
Calyptraea kalimnae Chapm. & Gabr.
Calyptraea crassa Tate.
Turritella tristira Tate.
Turritella acinella, sp. nov.
Turritella murrayana Tate.
Turritella conspicabilis Tate.
Turritella acricula Tate.
Terebra profunda Chapm. & Gabr.
Ringicula tatei Cossm.

Ostracoda.—

Pontocypris attenuata G.S.B.
Bairdia australis Chapm.
? Cythere laganella G.S.B.

Depth, 726 feet.

Nature of Rock.—Grey sand-rock, with shells.

Fossil Contents.—

Foraminifera.—

Quinqueloculina vulgaris d'Orb.
Quinqueloculina seminulum L. sp.
Quinqueloculina agglutinans d'Orb.
Gaudryina rugosa d'Orb.
Bolivina punctata d'Orb.
Lagena hispida Rss.
Sphaeroidina bulloides d'Orb.
Discorbina araucana d'Orb. sp.
Anomalina ammonoides Rss. sp.
Truncatulina mundula B.P. & J.
Pulvinulina elegans d'Orb. sp.

Anthozoa.—

? Flabellum victoriae Dunc.

Vermes.—

Ditrupa cornea L. var. *wormbetiensis* McCoy.

Polyzoa.—

Caberea grandis Hincks.

Pelecypoda.—

Venericardia solida Tate sp.

Ostracoda.—

Cythere sp. near *C. laganella* G.S.B.
Cythere quadriaculeata G.S.B.
Cythere acupunctata G.S.B.
Cytherella subtruncata Chapm.

Depth, 730 feet.

Nature of Rock.—Grey, calcareous sand-rock, with *Limopsis*.

Fossil Contents.—

Foraminifera.—

Biloculina sarsi Schlum.
Spiroloculina dispansa, sp. nov.
Spiroloculina acutimargo Brady.
Triloculina tricarinata d'Orb.
Triloculina trigonula Lam. sp.
Quinqueloculina schreiberiana d'Orb.
Quinqueloculina vulgaris d'Orb.
Quinqueloculina ferussacii d'Orb.
Quinqueloculina agglutinans d'Orb.
Quinqueloculina seminulum L. sp.
Cornuspira involvens Rss. sp.
Cornuspira striolata Brady.

Textularia abbreviata d'Orb.
Gaudryina pupoides d'Orb.
Gaudryina rugosa d'Orb.
Spiroplecta carinata d'Orb. sp.
Clavulina textularioidea Göes.
Nodosaria (D.) soluta Rss.
Cristellaria rotulata Lam. sp.
Polymorphina communis d'Orb.
Polymorphina compressa d'Orb.
Polymorphina rotundata Born. sp.
Uvigerina tenuistriata Rss.
Orbulina universa d'Orb.
Sphaeroidina bulloides d'Orb.
Truncatulina ungeriana d'Orb. sp.
Truncatulina mundula B.P. & J.
Anomalina polymorpha Costa.

Anthozoa.—

Bathyactis lens Dunc. sp.

Vermes.—

Ditrupa cornea L. sp. var. *wormbetiensis* McCoy.

Polyzoa.—

Melicerita acutimarginta MacG. sp.
Lunulites canaliculata MacG.
Selenaria marginata T.W.
Selenaria maculata Busk.

Brachiopoda.—

Murravia catinuliformis Tate sp.

Pelecypoda.—

Nuculana woodsi Tate sp.
Nuculana miliacea Hedley sp.
Limopsis insolita Sow. sp.
Glycymeris convexus Tate sp.
Lucina araea Tate.
Venericardia spinulosa Tate sp.
Venericardia pecten Tate sp.
Venericardia calva Tate sp.
Venericardia subcompacta, sp. nov.
Venericardia solida Tate sp.
Myodora gabrieli, sp. nov.
Katelysia multistrigosa, sp. nov.
Corbula ephamilla Tate.
Corbula pyxidata Tate.

Scaphopoda.—

Dentalium subfissura Tate sp.
Dentalium aratum Tate.

Gasteropoda.—

Pyramidella jonesiana Tate sp.
Calyptraca crassa Tate.
Epigrus variciferus, T.W. sp.
Turritella platyspira T.W.
Turritella tristira Tate.

Terebra profunda Chapm. & Gabr.
Roxania, indet. sp.

Ostracoda.—
Cythere crispata G.S.B.
Cythere caudispinosa, sp. nov.
Cythere normani G.S.B.
Pseudocythere caudata G.O. Sars.
Cytherella polita G.S.B.

Cirripedia—
Scalpellum (*Arcoscalpellum*) *dunni*, sp. nov.

Pisces.—
Otoliths of teleosteans, indet.

Depth, 741 feet.

Nature of Rock.—Grey calcareous sand-rock, with foraminifera and small shells.

Fossil Contents.—

Foraminifera.—
Spiroloculina dispansa, sp. nov.
Quinqueloculina vulgaris d'Orb.
Quinqueloculina lamarckiana d'Orb.
Quinqueloculina agglutinans d'Orb.
Triloculina tricarinata d'Orb.
Cornuspira foliacea Phil. sp.
Textularia gibbosa, var. *tuberosa* d'Orb. sp.
Bolivina textilarioides Rss.
Cassidulina subglobosa Brady.
Lagena elongata Ehr. sp.
Nodosaria (*D.*) *obliqua* L. sp.
Uvigerina pygmaea d'Orb.
Discorbina bertheloti d'Orb. sp.
Truncatulina lobatula W. & J. sp.
Truncatulina ungeriana d'Orb. sp.
Truncatulina mundula B.P. & J.
Rotalia clathrata Brady.

Anthozoa.—
Bathyactis beaumariensis Denn.

Polyzoa.—
Selenaria cupola T.W. sp.
Selenaria marginata T.W.
Selenaria maculata Busk.

Pelecypoda.—
Nuculana crebrecostata T.W. sp.
Limopsis maccoyi Chapm. (juv.).
Limopsis affinitalis, sp. nov.
Modiolus lineus Hedley sp.
Crassatellites communis Tate sp.
Lucina nuciformis Tate.
Lucina araea Tate.
Venericardia subcompacta, sp. nov.
Venericardia pecten Tate sp.

Montacuta sericea Tate sp.
Myodora gabrieli, sp. nov.
Antigona dimorphophylla Tate sp. (juv.).
Semele krauseana Tate.

Scaphopoda.—

Dentalium aratum Tate.

Gasteropoda.—

Liotella capitata Hedley sp.
Turbonilla radicans, sp. nov.
Turritella tristira Tate.
Turritella multicincturalis, sp. nov.

Ostracoda.—

Argilloecia gracilior Chapm.
Bairdia australis Chapm.
Cythere foveolata G.S.B.
Cythere quadriaculeata G.S.B.
Cythere scabrocuneata G.S.B.
Cythere dictyon G.S.B.
Cythere flexicostata Chapm.
Cythere rastromarginata G.S.B.
Cythere normani G.S.B.
Cythere parallelogramma G.S.B.
Cythere canaliculata Rss. sp.
Cythere postdeclivis Chapm.
Loxoconcha australis G.S.B.
Xestoleberis variegata G.S.B.
Cytherella pulchra G.S.B.
Cytherella punctata G.S.B.

Cirripedia.—

Balanus (*Balanus*) *amphitrite* Darwin, var. *acutus* Withers

Depth, 746 feet.

Nature of Rock.—Grey calcareous sandstone.

Fossil Contents.—

Foraminifera.—

Biloculina tubulosa Costa.
Quinqueloculina vulgaris d'Orb.
Gaudryina filiformis Berth.
Nodosaria (*D.*) *consobrina* d'Orb.
Discorbina bertheloti d'Orb. sp.
Discorbina vesicularis d'Orb. sp.
Truncatulina ungeriana d'Orb. sp.
Truncatulina mundula B.P. & J.

Vermes.—

Ditrupa cornea L. sp. var. *wormbetiensis* McCoy.

Pelecypoda.—

Condylocardia tenuicostae Chapm. & Gabr.

Ostracoda.—

Argilloecia badia G.S.B.
Cythere parallelogramma G.S.B.
Cytherella auricula Chapm.
Cytherella punctata G.S.B.

Depth, 758 feet.

Nature of Rock.—Greenish-grey marl.

Fossil Contents.—

Foraminifera.—

Biloculina depressa d'Orb.
Spiroloculina dispansa, sp. nov.
Quinqueloculina seminulum L. sp.
Quinqueloculina schreiberiana d'Orb.
Quinqueloculina vulgaris d'Orb.
Quinqueloculina agglutinans d'Orb.
Triloculina tricarinata d'Orb.
Cornuspira crassisepta Brady.
Cornuspira foliacea Phil. sp.
Spiroplecta carinata d'Orb. sp.
Nodosaria (*G.*) *laevigata* d'Orb.
Cristellaria cultrata Montf. sp.
Globigerina triloba Rss.
Orbulina universa d'Orb.
Sphaeroidina bulloides d'Orb.
Discorbina vesicularis d'Orb.
Anomalina ammonoides Rss. sp.
Truncatulina ungeriana d'Orb. sp.
Truncatulina lobatula W. & J. sp.

Polyzoa.—

Schizoporella rugosa MacG.

Pelecypoda.—

Nuculana fontinalis Pritch sp.
Chlamys cf. *keiloriana* Crespin.
Chlamys cf. *sturtiana* Tate sp. (cast).
Venericardia calva Tate sp.
Venericardia latissima Tate sp.

Scaphopoda.—

Dentalium sp. (fragments).

Gasteropoda.—

Eutrochus fontinalis Pritch. (see pl. xii., fig. 83).
Turritella acricula Tate.

Ostracoda.—

Macrocypris decora G.S.B.
Bairdia cf. *australis* Chapm.
Cythere normani G.S.B.
Cythere polytrema G.S.B.
Cytherella polita G. S. B.
Cytherella subtruncata Chapm.

Pisces.—

Otoliths of teleostean fishes, indet.

Depth, 768 feet.

Nature of Rock.—Greenish sandstone with fragmentary shells.

Fossil Contents.—

Foraminifera.—

Biloculina elongata d'Orb.
Quinqueloculina polygona d'Orb.

Pelecypoda.—

Nucula obliqua Lam.

Depth, 786 feet.

Nature of Rock.—Greenish sand-rock.

Fossil Contents.—

Foraminifera.—

Quinqueloculina vulgaris d'Orb.
Quinqueloculina polygona d'Orb.
Bolivina punctata d'Orb.
Discorbina bertheloti d'Orb. sp.
Truncatulina mundula B.P. & J.
Truncatulina ungeriana d'Orb. sp.
Rotalia clathrata Brady.

Pelecypoda.—

Venericardia cf. *trigonalis* Tate sp.

Ostracoda.—

Macrocypris decora G.S.B.
Bairdia australis Chapm.
Cythere scabrocuneata G.S.B.
Cythere caudispinosa, sp. nov.
Cythere dictyon G.S.B.
Cytherella polita G.S.B.
Cytherella pulchra G.S.B.
Cytherella punctata G.S.B.

Depth, 800 feet.

Nature of Rock.—Greenish-coloured sandstone with moulds and casts of shells.

Fossil Contents.—

Foraminifera.—

Biloculina bulloides d'Orb.
Triloculina tricarinata d'Orb.
Orbulina universa d'Orb.
Truncatulina ungeriana d'Orb. sp.
Truncatulina mundula B.P. & J.

Polyzoa.—

Selenaria cupola T.W. sp.

Ostracoda.—

Macrocypris decora G.S.B.
Bairdia australis Chapm.
Cythere scintillulata G.S.B.

Depth, 826 feet.

Nature of Rock.—Grey sand-rock with shell-fragments and microzoa.

Fossil Contents.—

Foraminifera.—

Triloculina circularis Born.
Quinqueloculina vulgaris d'Orb.
Orbulina universa d'Orb. (not typical).
Sphaeroidina bulloides d'Orb.
Discorbina rugosa d'Orb. sp.
Truncatulina ungeriana d'Orb. sp.
Anomalina ammonoides Rss. sp.

Pelecypoda.—

Pinna sp. indet.

Ostracoda.—

Cytherella lata G.S.B.

Depth, 850 feet.

Nature of Rock.—Dark grey marl with few shells.

Fossil Contents.—

Foraminifera.—

Biloculona sarsi Schl.
Biloculina bulloides d'Orb.
Biloculina irregularis d'Orb.
Triloculina circularis Born
Triloculina tricarinata d'Orb.
Quinqueloculina vulgaris d'Orb.
Quinqueloculina agglutinans d'Orb.
Quinqueloculina schreiberiana d'Orb.
Quinqueloculina lamarckiana d'Orb.
Bolivina aenariensis Costa sp.
Bolivina punctata d'Orb.
Nodosaria (D.) obliqua L. sp.
Cristellaria cultrata Montf. sp.
Orbulina universa d'Orb.
Truncatulina ungeriana d'Orb. sp.
Rotalia clathrata Brady.
Nonionina depressula W. & J. sp.
Nonionina scapha F. & M. sp.
Nonionina turgida Will. sp.

Anthozoa.—

Notophyllia gracilis Denn.
Mopsea tenisoni Chapm.

Pelecypoda.—

Limopsis maccoyi Chapm.
Venericardia calva Tate sp.
Venericardia spinulosa Tate sp.

Gasteropoda.—

Turritella platyspira T.W.
Cerithiopsis mitchellensis, sp. nov.
Turris trilirata Harris sp.
Eucithara subglabra, sp. nov.

Ostracoda.—

Cythere scutigera G.S.B.
Cythere dictyon G.S.B.
Krithe eggeri Chapm.
Krithe producta G.S.B.
Loxoconcha alata G.S.B.
Cytherella pulchra G.S.B.
Cytherella polita G.S.B.

Depth, 902 feet.

Nature of Rock.—Grey sand-rock.

Fossil Contents.—

Foraminifera.—

Biloculina bradyi Schl.
Biloculina bulloides d'Orb.
Spiroloculina dispansa, sp. nov.
Quinqueloculina vulgaris d'Orb.
Quinqueloculina schreiberiana d'Orb.
Quinqueloculina agglutinans d'Orb.
Quinqueloculina lamarckiana d'Orb.
Quinqueloculina ferussacii d'Orb.
Triloculina oblonga Montf. sp.
Nodosaria (D.) obliqua L. sp.
Nodosaria (D.) soluta Rss.
Orbulina universa d'Orb.
Sphaeroidina bulloides d'Orb.
Truncatulina ungeriana d'Orb. sp.
Truncatulina mundula B.P. & J.
Truncatulina lobatula W. & J. sp
Anomalina ammonoides Rss. sp.

Anthozoa.—

Parasmilia lucens Denn.

Polyzoa.—

Cellaria rigida MacG.
Cellaria australis MacG.
Cellepora sp. indet.
Acropora gracilis M. Edw. sp.
Idmonea hochstetteriana Stol. sp.

Pelecypoda.—

Nuculana acuticauda Pritch sp.
Sarepta obolella Tate sp.
Limopsis maccoyi Chapm.
Lissarca rubricata Tate sp.
Glycymeris gunyoungensis Chapm. and Singl.
Neotrigonia acuticostata McCoy sp.
Pseudamussium cf. *yahliensis* T.W. sp. (juv.).
Venericardia spinulosa Tate sp.
Venericardia compacta Tate sp.
Semele krausei McCoy sp.

Gasteropoda.—

Teinostoma calva, sp. nov.
Natica perspectiva Tate.

Epigrus variciferus T.W. sp.
Turritella tristira Tate.
Turritella platyspira T.W.
Turritella murrayana Tate.
Cerithiopsis cribarioides T.W. sp.
Marginella micula Tate.
Marginella crassidens, sp. nov.
Marginella wentworthi T.W.
Turris trilirata Harris sp.
Asthenotoma consutilis T.W. sp.
Eucithara bidens T.W. sp.
Buchozia columbelloides T.W. sp.
Cylichnella aratula Cossm. sp.
Cylichnella cuneopsis Cossm. sp.

Ostracoda.—
Macrocypris decora G.S.B.
Argilloecia badia G.S.B.
Bairdia australis Chapm.
Cythere canaliculata Rss. sp.
Cytherella pulchra G.S.B.
Cytherella punctata G.S.B.

Depth, 938 feet.

Nature of Rock.—Dark coloured marl, with small gasteropods.

Fossil Contents.—

Foraminifera.—
Biloculina bulloides d'Orb.
Biloculina bradyi Schl.
Quinqueloculina gracilis d'Odb.
Quinqueloculina agglutinans d'Orb.
Quinqueloculina polygona d'Orb.
Quinqueloculina seminulum L. sp.
Quinqueloculina vulgaris d'Orb.
Quinqueloculina schreiberiana d'Orb.
Textularia gibbosa d'Orb.
Gaudryina siphonella Reuss.
Clavulina communis d'Orb.
Spiroplecta sagittula Defr. sp.
Nodosaria (D.) soluta Rss.
Cristellaria articulata Rss.
Orbulina universa d'Orb.
Globigerina triloba Rss.
Sphaeroidina bulloides d'Orb.
Truncatulina ungeriana d'Orb. sp.
Truncatulina mundula B.P. & J.
Truncatulina mundula var. *carinata*, nov.
Anomalina ammonoides Rss. sp.

Anthozoa.—
Placotrochus deltoideus Dunc. (juv.).

Polyzoa.—
Cellaria australis MacG.
Selenaria marginata T.W. var. *lucens* MacG.
Bipora philippinensis Busk sp.

Pelecypoda.—
Nuculana crebrecostata T.W. sp.
Limopsis maccoyi Chapm.

Gasteropoda.—
Pyramidella polita Johnst.
Syrnola aff. *aurantiaca* Angas sp.
Turritella murrayana Tate.
Turritella tristira Tate.
Turritella platyspira T.W.
Cerithiopsis cribarioides T.W. sp.
Marginella kitsoni Chapm.
Conomitra ligata Tate sp.

Ostracoda.—
Bairdia amygdaloides G.S.B.
Argilloecia badia G.S.B.
Cythere sorrentae, sp. nov.
Cythere dictyon G.S.B.
Krithe eggeri Chapm.

Depth, 976 feet.

Nature of Rock.—Dark coloured marl with small gasteropods.
Fossil Contents.—
Foraminifera.—
Biloculina sarsi Schl.
Biloculina bulloides d'Orb.
Spiroloculina dispansa Chapm.
Quinqueloculina vulgaris d'Orb.
Quinqueloculina schreiberiana d'Orb.
Quinqueloculina agglutinans d'Orb.
Quinqueloculina lamarckiana d'Orb.
Cornuspira crassisepta Brady.
Haplophragmoides sphacroidiniforme Brady sp.
Textularia gibbosa d'Orb.
Clavulina communis d'Orb.
Bolivina nobilis Hantk.
Lagena marginata W. & B. sp.
Nodosaria (D.) obliqua L. sp.
Cristellaria articulata Rss.
Orbulina universa d'Orb.
Sphaeroidina bulloides d'Orb.
Truncatulina ungeriana d'Orb. sp.
Truncatulina mundula d'Orb. sp.
Truncatulina akneriana d'Orb. sp.
Anomalina ammonoides Rss. sp.
Pulvinulina elegans d'Orb. sp.
Polyzoa.—
Cellaria contigua MacG.
Cellaria australis MacG.
Lunulites canaliculata MacG.
Selenaria marginata T.W. sp.
Retepora beaniana King.

Pelecypoda.—

Limopsis maccoyi Chapm.
Venericardia scabrosa Tate sp.

Gasteropoda.—

Turbonilla constricta, sp. nov.
Turritella platyspira T.W.
Turritella tristira Tate.
Marginella wentworthi T.W.

Ostracoda.—

Cytherella punctata G.S.B.
Cytherella pulchra G.S.B.

Depth, 990 feet.

Nature of Rock.—Dark grey marl.

Fossil Contents.—

Foraminifera.—

Biloculina elongata d'Orb.
Biloculina bulloides d'Orb.
Biloculina irregularis d'Orb. sp.
Triloculina tricarinata d'Orb.
Triloculina trigonula Lam. sp.
Quinqueloculina schreiberiana d'Orb.
Quinqueloculina vulgaris d'Orb.
Quinqueloculina lamarckiana d'Orb.
Quinqueloculina agglutinans d'Orb.
Quinqueloculina ferussacii d'Orb.
Sigmoïlina sigmoidea Brady sp.
Cornuspira crassisepta Brady.
Spiroplecta sagittula Defr. sp.
Clavulina communis d'Orb.
Bolivina nobilis Hantk.
Lagena orbignyana Seg. sp.
Lagena laevigata Rss. sp.
Nodosaria (D.) communis d'Orb.
Cristellaria gibba d'Orb.
Cristellaria cultrata Montf. sp.
Cristellaria orbicularis d'Orb. sp.
Sphaeroidina bulloides d'Orb.
Truncatulina ungeriana d'Orb. sp.
Truncatulina mundula B.P. & J. var. *carinata,* nov.
Anomalina ammonoides Rss. sp.
Pulvinulina scabricula Chapm.

Anthozoa.—

Sphenotrochus alatus T.W.
Notophyllia gracilis Denn.
Mopsea hamiltoni Thomson sp.

Echinodermata.—

Spines, indet.

Polyzoa.—

Cellepora fossa Hasw. sp.
Retepora lineata MacG.

Brachiopoda.—
Murravia flindersi Chapm. sp.

Pelecypoda.—
Limopsis maccoyi Chapm.
Dimya dissimilis Tate.
Venericardia latissima Tate sp.

Scaphopoda.—
Dentalium aratum Tate.
Dentalium subfissura Tate.

Gasteropoda.—
Eulima bicurvata, sp. nov.
Natica hamiltonensis Tate.
Natica polita T.W. sp.
Turritella acinella, sp. nov.
Vermicularia (*Thylacodes*) *rudis* Tate sp.
Triforis wilkinsoni T.W.
Nassarius spiraliscabrus Chapm. & Gabr. sp.
Pyrene woodsii Pritch. sp.
Etrema trophonalis, sp. nov.
Marginella propinqua Tate.
Marginella wentworthi T.W.
Marginella winteri Tate.
Marginella kitsoni Chapm.
Marginella micula Tate.
Inquisitor sandleroides T.W. sp.

Ostracoda.—
Aglaia clavata G.S.B.
Cythere dictyon G.S.B.
Cythere normani G.S.B.
Cythere militaris G.S.B.
Xestoleberis foveolata G.S.B.
Cytherella punctata G.S.B.
Cytherella pulchra G.S.B.

Depth, 995 feet.

Nature of Rock.—Grey marl, with shells (*Turritella*).

Fossil Contents.—

Foraminifera.—
Biloculina bulloides d'Orb.
Biloculina angusta Chapm.
Biloculina depressa d'Orb.
Biloculina bradyi Schl.
Quinqueloculina ferussacii d'Orb.
Quinqueloculina agglutinans d'Orb.
Quinqueloculina vulgaris d'Orb.
Triloculina trigonula Lam. sp.
Cornuspira crassisepta Brady.
Cornuspira involvens Rss. sp.
Spiroplecta sagittula Defr. sp. var. *fistulosa* Brady.
Clavulina communis d'Orb.
Clavulina antipodum Stache.
Bolivina nobilis Hantk.

Lagena laevigata Rss.
Lagena orbignyana Seg. sp.
Lagena favosopunctata Brady.
Nodosaria (D.) retrorsa Rss. sp.
Nodosaria raphanus L. sp.
Orbulina universa d'Orb.
Truncatulina ungeriana d'Orb. sp.
Truncatulina mundula B.P. & J.
Truncatulina mundula var. *carinata,* nov.

Anthozoa.—
Trematotrochus fenestratus T.W. sp.

Echinodermata.—
Goniocidaris prunispinosa Chapm. & Cudmore (spines).

Polyzoa.—
Cellaria australis MacG.
Selenaria marginata T.W.
Tubiporella elevata Waters sp.
Adeona obliqua MacG.
Cellepora fossa Hasw. sp.
Retepora beaniana King.

Pelecypoda—
Nuculana crebrecostata T.W. sp.
Limopsis maccoyi Chapm.
Arca (Barbatia) crustata Tate sp.

Scaphopoda.—
Dentalium subfissura Tate.
Dentalium aratum Tate.
Dentalium mantelli Zittel.

Gasteropoda.—
Homalaxis praemeridionalis Chapm.
Turritella tristira Tate.
Cerithiella trigemmata, sp. nov.
Marginella woodsi Tate.
Marginella crassidens, sp. nov.
Marginella kitsoni Chapm.
Asthenotoma consutilis T.W. sp.
Uromitra ralphi Cossm.

Ostracoda.—
Bairdia amygdaloides G.S.B.
Cythere dictyon G.S.B.
Xestoleberis foveolata G.S.B.
Cytherella pulchra G.S.B.

Depth, 997 feet.

Nature of Rock.—Grey marl, with *Pinna*

Fossil Contents.—

Foraminifera.—
Biloculina elongata d'Orb.
Biloculina bulloides d'Orb.
Biloculina irregularis d'Orb.
Biloculina sarsi Schl.

Triloculina trigonula Lam. sp.
Quinqueloculina schreiberiana d'Orb.
Quinqueloculina vulgaris d'Orb.
Quinqueloculina lamarckiana d'Orb.
Quinqueloculina ferussacii d'Orb.
Quinqueloculina agglutinans d'Orb.
Sigmoïlina sigmoidea Brady sp.
Planispirina sphaera d'Orb. sp.
Cornuspira crassisepta Brady.
Cornuspira foliacea Phil. sp.
Cornuspira involvens Rss. sp.
Textularia abbreviata d'Orb.
Gaudryina rugosa d'Orb.
Spiroplecta sagittula Defr. sp. var. *fistulosa* Brady.
Bolivina textilarioides Rss.
Bolivina punctata d'Orb.
Lagena laevigata Rss.
Lagena quadricostulata Rss.
Lagena orbignyana Seg. sp.
Nodosaria (D.) pyrula d'Orb.
Frondicularia inaequalis Costa.
Cristellaria cultrata Montf. sp.
Polymorphina lactea W. & J. sp.
Globigerina bulloides d'Orb.
Pullenia quinqueloba Rss.
Truncatulina mundula B.P. & J.
Truncatulina ungeriana d'Orb. sp.
Anomalina ammonoides Rss. sp.
Pulvinulina auricula F. & M. sp.

Anthozoa.—
Mopsea hamiltoni Thomson sp.

Echinodermata.—
Echinoid spines, indet.

Polyzoa.—
Cellaria contigua MacG.
Adeona obliqua MacG.

Pelecypoda.—
Pinna sp. indet.

Gasteropoda.—
Epigrus variciferus T.W. sp.
Cerithiopsis cribarioides T.W. sp.
Nassarius tatei T.W. sp.
Uromitra ralphi Cossm.

Ostracoda.—
Cythere militaris G.S.B.
Cythere normani G.S.B.
Cythere cf. *dictyon* G.S.B.
Xestoleberis foveolata G.S.B.
Xestoleberis curta G.S.B.
Cytherella auricula Chapm.
Cytherella sulcosa, sp. nov.
Cytherella punctata G.S.B.
Cytherella polita G.S.B.
Cytherella pulchra G.S.B.

Depth, 1,025 feet.

Nature of Rock.—Grey sandy marl, with shells and polyzoa.

Fossil Contents.—

Foraminifera.—

Biloculina bulloides d'Orb.
Biloculina depressa d'Orb.
Biloculina bradyi Schl.
Triloculina trigonula Lam. sp.
Quinqueloculina vulgaris d'Orb.
Quinqueloculina agglutinans d'Orb.
Quinqueloculina schreiberiana d'Orb.
Quinqueloculina lamarckiana d'Orb.
Cornuspira involvens Rss. sp.
Cornuspira foliacea Phil. sp.
Cornuspira crassisepta Brady.
Clavulina communis d'Orb.
Bolivina textilarioides Rss.
Lagena orbignyana Seg. sp.
Lagena schlichti A. Silv. sp.
Lagena favosopunctata Brady.
Nodosaria (G.) laevigata d'Orb. sp.
Nodosaria (D.) soluta Rss.
Cristellaria gibba d'Orb.
Cristellaria cultrata Montf. sp.
Orbulina universa d'Orb.
Globigerina bulloides d'Orb.
Sphaeroidina bulloides d'Orb.
Truncatulina mundula B.P. & J.
Truncatulina wuellerstorfi Schw. sp.
Anomalina ammonoides Rss. sp.
Pulvinulina exigua Brady.
Rotalia clathrata Brady.

Polyzoa.—

Amphiblestrum ctenostoma, sp. nov.
Selenaria marginata T.W.
Adeona obliqua MacG.

Pelecypoda.—

Limopsis maccoyi Chapm.
Lepton crassum Tate.
Venericardia gracilicostata T.W. sp.

Gasteropoda.—

Mathilda decorata Hedley.
Turritella platyspira T.W.
Turritella tristira Tate.
Triforis wilkinsoni T.W.
Ringicula tenuilirata Cossm.

Ostracoda.—

Aglaia clavata G.S.B.
Bairdia amygdaloides G.S.B.
Cythere dictyon G.S.B.
Cytherella intermedia, sp. nov.

Depth, 1,034 feet.

Nature of Rock.—Grey sandy marl with shells (*Meretrix* and *Turritella*).

Fossil Contents.—

Foraminifera.—

Triloculina trigonula Lam. sp.
Quinqueloculina vulgaris d'Orb.
Quinqueloculina schreiberiana d'Orb.
Quinqueloculina lamarckiana d'Orb.
Quinqueloculina ferussacii d'Orb.
Quinqueloculina agglutinans d'Orb.
Cornuspira crassisepta Brady.
Spiroplecta sagittula Defr. sp. var. *fistulosa* Brady.
Clavulina communis d'Orb.
Lagena orbignyana Seg. sp.
Nodosaria (G.) laevigata d'Orb. sp.
Nodosaria (D.) consobrina d'Orb.
Nodosaria (D.) obliqua L. sp.
Cristellaria articulata Rss. sp.
Orbulina universa d'Orb.
Sphaeroidina bulloides d'Orb.
Truncatulina mundula B.P. & J.
Truncatulina ungeriana d'Orb. sp.
Truncatulina wuellerstorfi Schw. sp.
Anomalina ammonoides Rss. sp.
Rotalia clathrata Brady.

Anthozoa.—

Trematotrochus fenestratus T.W. sp.

Echinodermata.—

Goniocidaris prunispinosa Chapm. & Cudm.

Polyzoa.—

Cellaria rigida MacG. var. *venusta* MacG.
Cellaria rigida MacG. var. *perampla* Waters.
Lunulites canaliculata MacG.
Adeona obliqua MacG.
Acropora gracilis M. Edw. sp.
Cellepora fossa Hasw. sp.
Retepora aciculifera MacG.

Pelecypoda.—

Nucula obliqua Lam. (juv.).
Nuculana vagans Tate sp.
Limopsis maccoyi Chapm.
Cuna polita Tate sp.

Gasteropoda.—

Turritella platyspira T.W.
Marginella kitsoni Chapm.
Marginella wentworthi T.W.

Ostracoda.—

Aglaia clavata G.S.B.
Cythere scintillulata G.S.B.
Cythere quadriaculeata G.S.B.

Cythere dictyon G.S.B.
Cytherella intermedia, sp. nov.
Cytherella punctata G.S.B.
Cytherella pulchra G.S.B.

Depth, 1,050 feet.

Nature of Rock.—Grey marl.

Fossil Contents.—

Foraminifera.—

Biloculina bradyi Schl.
Biloculina irregularis d'Orb.
Biloculina bulloides d'Orb.
Triloculina tricarinata d'Orb.
Triloculina trigonula Lam. sp.
Triloculina oblonga Montf. sp.
Quinqueloculina linnaeana d'Orb. sp.
Quinqueloculina schreiberiana d'Orb.
Quinqueloculina vulgaris d'Orb.
Quinqueloculina lamarckiana d'Orb.
Bolivina textilarioides Rss.
Nodosaria (D.) obliqua L. sp.
Nodosaria (D.) soluta Rss.
Cristellaria gibba d'Orb.
Sphaeroidina bulloides d'Orb.
Truncatulina mundula B.P. & J.
Truncatulina mundula B.P. & J. var. *carinata*, nov.
Truncatulina wuellerstorfi Schw. sp.

Anthozoa.—

Trematotrochus fenestratus T.W. sp.

Polyzoa.—

Lunulites rutella T.W.
Selenaria marginata T.W.
Bipora philippinensis Busk sp.

Pelecypoda.—

Nuculana chapmani Finlay.
Nuculana vagans Tate sp.
Dimya dissimilis Tate.
Venericardia gracilicostata T.W. sp. (juv.).

Gasteropoda.—

Pyramidella jonesiana Tate sp.
Turritella tristira Tate.
Turritella platyspira T.W.
Turbonilla tenuissima Hedley.
Pyrene cainozoica T.W. sp.
Pyrene balcombensis Pritch. sp.
Murex polyphyllus T.W.
Fasciolaria rugata Tate.
Etrema praespurca, sp. nov.
Marginella muscarioides Tate.
Marginella wentworthi T.W.
Guraleus volutiformis, sp. nov.

Ostracoda.—

Argilloecia badia G.S.B.
Cythere dictyon G.S.B.
Cythere reussii G.S.B.
Cythere quadriaculeata G.S.B.
Cytherella intermedia, sp. nov.
Cytherella pulchra G.S.B.

Depth, 1,060 feet.

Nature of Rock.—Grey sandy marl.

Fossil Contents.—

Foraminifera.—

Biloculina sarsi Schl.
Biloculina bradyi Schl.
Biloculina bulloides d'Orb.
Triloculina tricarinata d'Orb.
Triloculina trigonula Lam. sp.
Quinqueloculina vulgaris d'Orb.
Quinqueloculina lamarckiana d'Orb. sp.
Quinqueloculina linnaeana d'Orb. sp.
Quinqueloculina schreiberiana d'Orb. sp.
Quinqueloculina agglutinans d'Orb. sp.
Sigmoïlina sigmoidea Brady sp.
Planispirina exigua Brady.
Textularia gibbosa d'Orb.
Gaudryina rugosa d'Orb.
Bolivina textilarioides Rss.
Lagena sulcata W. & J. sp.
Nodosaria (D.) plebeia Rss.
Orbulina universa d'Orb.
Globigerina triloba Rss.
Sphaeroidina bulloides d'Orb.
Truncatulina ungeriana d'Orb. sp.
Truncatulina mundula B.P. & J. var. *carinata*, nov.
Truncatulina wuellerstorfi Schw. sp.
Anomalina ammonoides Rss. sp.
Pulvinulina elegans d'Orb. sp.
Rotalia clathrata Brady.
Polystomella craticulata F. & M. sp.

Anthozoa.—

Sphenotrochus alatus T.W.
Trematotrochus fenestratus T.W. sp.

Echinodermata.—

cf. *Goniocidaris* sp.

Polyzoa.—

Lunulites rutella T.W.
Selenaria concinna T.W.
Bipora philippinensis Busk sp.

Scaphopoda.—

Dentalium aratum Tate.

Gasteropoda.—

Triforis wilkinsoni T.W.
Pyrene oxleyi T.W. sp.
Marginella wentworthi T.W.
Marginella globiformis, sp. nov.
Buchozia hemiothone T.W. sp.

Ostracoda.—

Argilloecia badia G.S.B.
Cythere canaliculata Rss. sp.
Cythere caudispinosa, sp. nov.
Cythere flexicostata Chapm.
Cythere scutigera G.S.B.
Cythere parallelogramma G.S.B.
Cythere normani G.S.B.
Cytherella auricula Chapm.
Cytherella punctata G.S.B.

Depth, 1,070 feet.

Nature of Rock.—Grey sandy marl.

Fossil Contents.—

Foraminifera.—

Biloculina bradyi Schl.
Spiroloculina arenaria Brady.
Triloculina tricarinata d'Orb.
Triloculina trigonula Lam. sp.
Quinqueloculina ferussacii d'Orb.
Quinqueloculina polygona d'Orb.
Quinqueloculina vulgaris d'Orb.
Planispirina exigua Brady.
Cornuspira foliacea Phil. sp.
Nodosaria (G.) laevigata d'Orb.
Truncatulina ungeriana d'Orb. sp.
Siphonina reticulata Cz. sp.
Nonionina umbilicatula Montf. sp.

Polyzoa.—

Selenaria concinna T.W.

Pelecypoda.—

Nuculana crebrecostata T.W. sp.
Protocardia ornithopetronica, sp. nov
Leucozonia micronema Tate.

Gasteropoda.—

Triforis wilkinsoni T.W.
Marginella globiformis, sp. nov.
Cylichnella infundibulata Coss. sp.

Ostracoda.—

Cythere scintillulata G.S.B.
Xestoleberis margaritea G.S.B.
Cytherella subtruncata Chapm.

Depth, 1,088 feet.

Nature of Rock.—Grey marl with small shells.

Fossil Contents.—

Foraminifera.—

Biloculina elongata d'Orb.
Biloculina bulloides d'Orb.
Biloculina irregularis d'Orb.
Triloculina tricarinata d'Orb.
Triloculina trigonula Lam. sp.
Quinqueloculina agglutinans d'Orb.
Quinqueloculina lamarckiana d'Orb.
Quinqueloculina schreiberiana d'Orb.
Quinqueloculina vulgaris d'Orb.
Quinqueloculina linnaeana d'Orb. sp.
Cornuspira foliacea Phil. sp.
Textularia abbreviata d'Orb.
Spiroplecta sagittula Defr. sp. var. *fistulosa* Brady.
Clavulina angularis d'Orb.
Clavulina communis d'Orb.
Bolivina textilarioides d'Orb.
Bolivina punctata d'Orb.
Lagena globosa Montf. sp.
Lagena schlichti Silv. sp.
Nodosaria (D.) soluta Rss.
Frondicularia nuda, sp. nov.
Marginulina glabra d'Orb.
Cristellaria articulata Rss.
Orbulina universa d'Orb.
Sphaeroidina bulloides d'Orb.
Truncatulina lobatula W. & J. sp.
Truncatulina mundula B.P. & J.
Truncatulina mundula B.P. & J. var. *carinata*, var. nov.
Truncatulina wuellerstorfi Schw. sp.
Anomalina ammonoides Rss. sp.
Pulvinulina auricula F. & M. sp.
Rotalia clathrata Brady.

Polyzoa.—

Selenaria marginata var. *lucens* MacG.
Lunulites rutella T.W.
Acropora gracilis M.Edw. sp.

Pelecypoda.—

Crassatellites communis Tate sp.
Venericardia delicatula Tate sp.

Gasteropoda.—

Natica polita T.W. sp.
Rissoa varicifera T.W.
Turritella acricula Tate.
Cerithiopsis mitchellensis, sp. nov.
Styliola rangiana Tate.

Ostracoda.—

Aglaia clavata G.S.B.
Bairdia australis Chapm.

Cythere normani G.S.B.
Cythere dictyon G.S.B.
Cythere scutigera G.S.B.
Cythere caudispinosa, sp. nov.
Cythere sorrentae, sp. nov.
Cytherura praemucronata, sp. nov.
Cytherella lata G.B.B.
Cytherella punctata G.S.B.
Cytherella intermedia, sp. nov.

Pisces.—
Otolith of teleostean fish, indet.

Depth, 1,090 feet.

Nature of Rock.—Grey sandy marl with polyzoa, *Spondylus* and *Marginella.*

Fossil Contents.—

Foraminifera.—
Biloculina depressa d'Orb.
Biloculina irregularis d'Orb.
Biloculina elongata d'Orb.
Triloculina tricarinata d'Orb.
Quinqueloculina vulgaris d'Orb.
Quinqueloculina schreiberiana d'Orb.
Quinqueloculina lamarckiana d'Orb.
Quinqueloculina agglutinans d'Orb.
Quinqueloculina polygona d'Orb.
Quinqueloculina ferussacii d'Orb.
Planispirina exigua Brady.
Bolivina aenariensis d'Orb.
Lagena globosa Montf. sp.
Nodosaria (D.) communis d'Orb.
Marginulina glabra d'Orb.
Orbulina universa d'Orb.
Truncatulina wuellerstorfi Schw.
Truncatulina ungeriana d'Orb. sp.
Truncatulina mundula B.P. & J.
Truncatulina akneriana d'Orb. sp.

Vermes.—
Ditrupa cornea L. sp. var. *wormbetiensis* McCoy.

Polyzoa.—
Selenaria concinna T.W.

Pelecypoda.—
Nuculana woodsi Tate sp.
Limopsis maccoyi Chapm.
Dimya dissimilis Tate.
Pseudamussium yahliensis T.W. sp.
Spondylus cf. *pseudoradula* McCoy.
Crassatellites communis Tate sp.

Gasteropoda.—
Natica polita T.W.
Turritella acricula Tate.
Turritella tristira Tate.

Ataxocerithium serotinoides, sp. nov.
Marginella wentworthi T.W.
Ancilla ligata Tate sp.

Ostracoda.—

Bairdia amygdaloides G.S.B.
Cythere normani G.S.B.
Cythere dictyon G.S.B.
Cythere sorrentae, sp. nov.
Krithe eggeri Chapm.
Xestoleberis variegata G.S.B.
Cytherella pulchra G.S.B.
Cytherella intermedia Chapm.

Depth, 1,107 feet.

Nature of Rock.—Grey sandy marl, with *Dentalium.*

Fossil Contents.—

Foraminifera.—

Biloculina sarsi Schl.
Biloculina bradyi Schl.
Biloculina bulloides d'Orb.
Biloculina elongata d'Orb.
Triloculina trigonula Lam. sp.
Quinqueloculina sclerotica Karrer.
Quinqueloculina lamarckiana d'Orb.
Quinqueloculina agglutinans d'Orb.
Quinqueloculina schreiberiana d'Orb.
Quinqueloculina vulgaris d'Orb.
Quinqueloculina polygona d'Orb.
Quinqueloculina linnaeana d'Orb. sp.
Cornuspira foliacea Phil. sp.
Cornuspira crassisepta Brady.
Textularia gibbosa d'Orb.
Spiroplecta sagittula Defr. sp. var. *fistulosa* Brady.
Lagena globosa Montf. sp.
Cristellaria rotulata Lam. sp.
Truncatulina ungeriana d'Orb. sp.
Truncatulina mundula B.P. & J.
Truncatulina mundula B.P. & J. var. *carinata*, nov.
Anomalina ammonoides Rss. sp.
Rotalia clathrata Brady.
Nonionina umbilicatula W. & J. sp.

Polyzoa.—

Idmonea hochstetteriana Stol. sp.
Cellaria australis MacG.
Cellaria sp. ind.
Selenaria marginata T.W.
Bipora cancellata Busk sp.
Bipora philippinensis Busk sp.
Cribrilina elevata MacG.
Haswellia producta MacG.
Acropora gracilis M.Edw. sp.
Cellepora fossa Hasw. sp.

Pelecypoda.—

Nuculana chapmani Finlay.
Nuculana fortis Hedley sp.
Sarepta planiuscula Tate sp.
Propeleda huttoni T.W. sp.
Limopsis maccoyi Chapm.
Lissarca cincturata, sp. nov.
Lissarca rubricata Tate sp.
Glycymeris gunyoungensis Chapm. and Singl.
Lima bassi T.W.
Philobrya bernardi Tate.
Crenella globularis Tate.
Cuna multilamella Tate sp.
Venericardia spinulosa Tate sp.
Venericardia compacta Tate sp.
Venericardia scabrosa Tate sp.

Scaphopoda.—

Dentalium subfissura Tate.

Gasteropoda—

Teinostoma calva, sp. nov.
Natica gatliffi, sp. nov.
Epigrus variciferus T.W. sp.
Turritella platyspira T.W.
Cerithiopsis cribarioides T.W. sp.
Cerithiella trigemmata, sp. nov.
Fusinus senticosus Tate sp.
Trophon halli, sp. nov.
Trophon profundus, sp. nov.
Pyrene oxleyi T.W. sp.
Marginella wentworthi T.W.
Marginella kitsoni Chapm.
Etrema praespurca, sp. nov.
Cylichnella angustata Tate & Cossm sp.
Cylichnella infundibulata Cossm. sp.

Ostracoda.—

Aglaia clavata G.S.B.
Cythere lubbockiana G.S.B.
Cythere normani G.S.B.
Cytherella polita G.S.B.
Cytherella punctata G.S.B.
Cytherella intermedia, sp. nov.

Depth, 1,132 feet.

Nature of Rock.—Hard, grey, marly sandstone, with shells, indet.
Fossil Contents.—Indeterminate.

Depth, 1,138 feet.

Nature of Rock.—Grey sand-rock.
Fossil Contents.—

Foraminifera.—

Biloculina elongata d'Orb.
Biloculina laevis Defr. sp.

Spiroloculina dispansa, sp. nov.
Quinqueloculina vulgaris d'Orb.
Triloculina tricarinata d'Orb.
Sigmoïlina sigmoidea Brady sp.
Spiroplecta carinata d'Orb. sp.
Spiroplecta sagittula Defr. sp. var. *fistulosa* Br.
Nodosaria (G.) laevigata d'Orb.
Truncatulina ungeriana d'Orb. sp.
Truncatulina mundula B.P. & J.
Anomalina ammonoides Rss. sp.
Calcarina defrancii d'Orb.
Nonionia depressula W. & J. sp.

Polyzoa.—
Selenaria concinna T.W.
Bipora philippinensis Busk sp.

Pelecypoda—
Nuculana woodsi Tate.
Glycymeris gunyoungensis Chapm. and Singl.
Limopsis insolita Sow sp.
Venericardia spinulosa Tate sp.
Cardium hemimeris Tate.

Scaphopoda.—
Dentalium aratum Tate.

Gasteropoda—
Teinostoma calva, sp. nov.
Turbonilla weeahensis Chapm. & Gabr.
Turritella tristira Tate.
Turritella platyspira T.W.
Marginella globiformis, sp. nov.
Inquisitor integra T.W. sp.

Ostracoda.—
Aglaia clavata G.S.B.
Bairdia australis Chapm.
Cythere scintillulata G.S.B.
Cythere canaliculata Rss. sp.
Cythere dictyon G.S.B.
Krithe eggeri Chapm.
Cytherella intermedia. sp. nov.
Cytherella auricula Chapm.

Depth, 1,144 feet.

Nature of Rock.—Grey sandstone with shells, indet.
Fossil Contents.—Indeterminate.

Depth, 1,150 feet.

Nature of Rock.—Grey sand-rock, with foraminifera and shells.
Fossil Contents.—

Foraminifera.—
Quinqueloculina linnaeana d'Orb. sp.
Quinqueloculina lamarckiana d'Orb.
Quinqueloculina vulgaris d'Orb.
Quinqueloculina agglutinans d'Orb.
Cornuspira carinata Costa sp.

Cellaria australis MacG.
Nodosaria (D.) obliqua L. sp.
Cristellaria rotulata Lam. sp.

Anthozoa.—
Mopsea sp.

Polyzoa.—
Melicerita acutimarginata MacG. sp.

Pelecypoda—
Cuna multilamella Tate sp.
Venericardia calva Tate sp.

Gasteropoda.—
Cyclostrema cornuspira, sp. nov.
Turritella acricula Tate.
Turritella tristira Tate.
Bullinella sp. indet. (juv.).

Ostracoda.—
Bairdia australis Chapm.
Cytherella punctata G.S.B.

Depth, 1,154 feet.

Nature of Rock.—Hard grey sandstone.

Fossil Contents.—

Gasteropoda.—
Turritella sp.

Depth, 1,158 feet.

Nature of Rock.—Grey sand-rock.

Fossil Contents.—

Foraminifera.—
Biloculina bradyi Schl.
Biloculina depressa d'Orb.
Spiroloculina dispansa, sp. nov.
Spiroloculina arenaria Brady.
Triloculina circularis Börn.
Quinqueloculina schreiberiana d'Orb.
Quinqueloculina vulgaris d'Orb.
Quinqueloculina lamarckiana d'Orb.
Clavulina cylindrica Hantken.

Anthozoa.—
Trematotrochus fenestratus T.W. sp.
Sphenotrochus emarciatus Dunc.

Echinodermata.—
Echinocyamus (Scutellina) patella Tate sp.

Polyzoa.—
Cellaria australis MacG.
Selenaria concinna T.W.

Pelecypoda—
Nucula obliqua Lam.
Nuculana woodsi Tate sp.
Propeleda huttoni T.W. sp.
Glycymeris gunyoungensis Chapm. and Singl.

Trigonia tubulifera Tate.
Dimya dissimilis Tate.
Montacuta sericea Tate.
Lucina projecta Tate.
Macrocallista submultistriata Tate sp.

Scaphopoda.—
Dentalium mantelli Zittel.

Gasteropoda.—
Emarginula transenna T.W.
Teinostoma calva, sp. nov.
Epitonium crebrelamellatum Tate sp.
Nassarius tatei T.W. sp.
Marginella wentworthi T.W.
Etrema pseudoelegans, sp. nov.
Cylichnella cuneopsis Cossm. sp.
Ringicula tenuilirata Cossm.

Depth, 1,160 feet.

Nature of Rock.—Greenish-grey sand-rock with polyzoa and mollusca.

Fossil Contents.—

Foraminifera.—
Biloculina depressa d'Orb.
Biloculina bulloides d'Orb.
Biloculina irregularis d'Orb.
Triloculina tricarinata d'Orb.
Triloculina oblonga Montf. sp.
Quinqueloculina linnaeana d'Orb. sp.
Quinqueloculina agglutinans d'Orb.
Quinqueloculina schreiberina d'Orb.
Quinqueloculina lamarckiana d'Orb.
Quinqueloculina vulgaris d'Orb.
Quinqueloculina ferussacii d'Orb.
Bulimina buchiana d'Orb.
Lagena aspera Rss.
Nodosaria (*D.*) *soluta* Rss.
Cristellaria cultrata Montf. sp.
Truncatulina ungeriana d'Orb. sp.
Siphonina reticulata Cz. sp.

Polyzoa.—
Crisia scalaris MacG.
Bipora philippinensis Busk sp.

Pelecypoda.—
Dimya dissimilis Tate.
Venericardia gracilicostata T.W. sp.
Cuna lamellata Tate sp.
Neolepton novacambricum Hedley.

Ostracoda.—
Pontocypris subreniformis G.S.B.
Cythere normani G.S.B.
Cythere scabrocuneata G.S.B.

Depth, 1,164 feet.

Nature of Rock.—Grey sand-rock.

Fossil Contents.—

Foraminifera.—

Quinqueloculina schreiberiana d'Orb.
Quinqueloculina agglutinans d'Orb.
Sigmoïlina celata Costa sp.
Cornuspira involvens Rss. sp.
Nodosaria (D.) soluta Rss.
Truncatulina ungeriana d'Orb. sp.
Truncatulina mundula B.P. & J.
Truncatulina mundula B.P. & J. var. *carinata*, nov.

Polyzoa.—

Hornera foliacea MacG.
Cellaria contigua MacG.
Selenaria concinna T.W.
Selenaria marginata T.W.
Adeona obliqua MacG.
Cellepora fossa Hasw. sp.
Cellepora tridenticulata var. *nummularia* Busk.

Brachiopoda.—

Terebratula tateana T.W.

Pelecypoda.—

Sarepta obolella Tate sp.
Glycymeris gunyoungensis Chapm. and Singl.
Dimya dissimilis Tate.
Venericardia compacta Tate sp.

Gasteropoda.—

Natica subnoae Tate.
Turritella platyspira T.W.
Siliquaria occlusa T.W. sp.
Nassarius tatei T.W. sp.
Marginella wentworthi T.W.
Conomitra ligata Tate sp.
Turris optatus Harris sp.
Inquisitor sandleroides T.W. sp.
Eucithara bidens T.W. sp.
Buchozia hemiothone T.W. sp.
Cylichnella aratula Cossm. sp.
Cylichnella cuneopsis Cossm. sp.
Ringicula lactea Johnston.

Ostracoda.—

Aglaia clavata G.S.B.
Bairdia australis Chapm.
Cytherella punctata G.S.B.

Depth, 1,170 feet.

Nature of Rock.—Grey marl.

Fossil Contents.—

Foraminifera.—

Biloculina bradyi Schl.
Biloculina bulloides d'Orb.

Spiroloculina dispansa, sp. nov.
Quinqueloculina vulgaris d'Orb.
Quinqueloculina lamarckiana d'Orb.
Quinqueloculina agglutinans d'Orb.
Cornuspira crassiscpta Brady.
Clavulina cylindrica Hantk.
Nodosaria (D.) soluta Rss.
Truncatulina ungeriana d'Orb. sp.

Polyzoa.—
Melicerita angustiloba Busk sp.
Selenaria marginata T.W. var. *lucens* MacG.
Selenaria maculata Busk.
Cellepora fossa Hasw. sp.
Bipora philippinensis Busk sp.

Pelecypoda.—
Venericardia compacta Tate sp.

Scaphopoda.—
Dentalium mantelli Zittel.

Gasteropoda.—
Turbonilla radicans, sp. nov.
Rissoina lintea Hedley & May.
Mathilda decorata Hedley.
Turritella platyspira T.W.
Turritella tristira Tate.
Trophon profundus, sp. nov.
Marginella micula Tate.
Marginella wentworthi T.W.

Ostracoda.—
Bairdia australis Chapm.

Depth, 1,180 feet.

Nature of Rock.—Grey marl.

Fossil Contents.—

Foraminifera.—
Biloculina bulloides d'Orb.
Biloculina bradyi Schl.
Spiroloculina dispansa, sp. nov.
Quinqueloculina agglutinans d'Orb.
Quinqueloculina vulgaris d'Orb.
Quinqueloculina lamarckiana d'Orb.
Cornuspira crassisepta Brady.
Haplophragmoides sphaeroidiniforme Brady sp.
Spiroplecta sagittula Defr. sp.
Clavulina cylindrica Hantk.
Clavulina communis d'Orb.
Nodosaria (D.) soluta Rss.
Polymorphina sororia Rss.
Truncatulina ungeriana d'Orb. sp.

Anthozoa.—
Flabellum victoriae Dunc.
Bathyactis lens Dunc. sp.
Notophyllia variolaris T.W. sp.

Vermes.—

Ditrupa cornea L. sp. var. *wormbetiensis* McCoy.

Polyzoa—

Melicerita angustiloba Busk.
Melicerita acutimarginata MacG. sp.
Selenaria maculata Busk.
Lunulites canaliculata MacG.
Adeona obliqua MacG.
Hiantopora halli MacG.
Cellepora fossa Hasw. sp.

Pelecypoda.—

Lepton crassum Tate.
Venericardia gracilicostata T.W. sp.
Venericardia compacta Tate sp.

Gasteropoda.—

Teinostoma calva, sp. nov.
Natica polita T.W.
Cerithiopsis mitchellensis, sp. nov.
Turritella acricula Tate.
Turritella tristira Tate.
Latirus semiundulatus Pritch.
Marginella wentworthi T.W.
Turris optatus Harris sp.
Conomitra ligata Tate sp.

Ostracoda.—

Bairdia australis Chapm.

Depth, 1,191 feet.

Nature of Rock.—Grey sand-rock.

Fossil Contents.—

Foraminifera.—

Biloculina bradyi Schl.
Biloculina sarsi Schl.
Biloculina ringens Lam.
Biloculina irregularis d'Orb.
Triloculina tricarinata d'Orb.
Triloculina trigonula Lam. sp.
Spiroloculina dispansa, sp. nov.
Quinqueloculina schreiberiana d'Orb.
Quinqueloculina lamarckiana d'Orb. sp.
Quinqueloculina vulgaris d'Orb.
Quinqueloculina linnaeana d'Orb. sp.
Cornuspira striolata Br.
Nodosaria (D.) soluta Rss.
Orbulina universa d'Orb.

Anthozoa.—

Bathyactis lens Dunc. sp.

Echinodermata.—

Echinoid spine, indet.

Polyzoa.—

Cellaria australis MacG.
Melicerita augustiloba Busk.
Selenaria concinna T.W.
Selenaria marginata T.W.
Adeona obliqua MacG.
Bipora cancellata Busk sp.
Bipora philippinensis Busk sp.
Acropora gracilis M.Edw. sp.

Pelecypoda.—

Limopsis maccoyi Chapm.
Glycymeris gunyoungensis Chapm. and Singl.
Spondylus pseudoradula McCoy.
Venericardia scabrosa Tate sp.
Venericardia compacta Tate sp.
Cuna multilamella Tate sp.

Gasteropoda.—

Teinostoma calva, sp. nov.
Turritella acricula Tate.
Marginella wentworthi T.W.
Uromitra ralphi Cossm.
Inquisitor integra T.W. sp.

Pisces.—

Fish otolith, indet.

Depth, 1,200 feet.

Nature of Rock.—Grey sand-rock.

Fossil Contents.—

Foraminifera.—

Biloculina bulloides d'Orb.
Biloculina depressa d'Orb.
Triloculina tricarinata d'Orb.
Quinqueloculina linnaeana d'Orb. sp.
Quinqueloculina vulgaris d'Orb.
Quinqueloculina agglutinans d'Orb.
Quinqueloculina schreiberina d'Orb.
Quinqueloculina lamarckiana d'Orb.
Textularia gibbosa d'Orb.
Clavulina cylindrica Hantk.
Nodosaria (*D.*) *inflexa* Rss.
Nodosaria (*D.*) *soluta* Rss.
Cristellaria rotulata Lam. sp.

Anthozoa.—

Mopsea sp.

Polyzoa.—

Lunulites parvicella T.W. sp.

Pelecypoda.—

Nuculana chapmani Finlay.
Limopsis maccoyi Chapm.

Gasteropoda.—

Natica subnoae Tate.
Turritella acinella, sp. nov.
Turritella acricula Tate.
Turbonilla tenuissima Hedley.
Pyramidella jonesiana Tate sp.
Marginella crassidens, sp. nov.
Uromitra ralphi Cossm.
Eucithara bidens T.W. sp.
Cylichnella infundibulata Cossm. sp.

Depth, 1,204 feet.

Nature of Rock.—Grey sandy marl.

Fossil Contents.—

Foraminifera.—

Biloculina sarsi Schl.
Biloculina bradyi Schl.
Triloculina tricarinata d'Orb.
Spiroloculina dispansa, sp. nov.
Quinqueloculina vulgaris d'Orb.
Quinqueloculina linnaeana d'Orb sp.
Cornuspira foliacea Phil.
Textularia gibbosa var. *tuberosa* d'Orb.
Clavulina cylindrica Hantk. sp.

Anthozoa.—

Sphenotrochus emarciatus Dunc.
Notophyllia gracilis Denn.

Polyzoa.—

Cellaria australis MacG.
Cellaria contigua MacG.
Melicertia augustiloba Busk.
Melicerita acutimarginata MacG. sp.
Selenaria concinna T.W.
Cribrilina elevata MacG.
Adeona obliqua MacG.
Bipora philippinensis Busk sp.
Acropora gracilis M.Ed. sp.
Cellepora stellata Maplestone.
Cellepora fossa Hasw. sp.
Cellepora tridenticulata var. *nummularia* Busk.

Pelecypoda.—

Limopsis maccoyi Chapm.
Glycymeris gunyoungensis Chapm. and Singl.
Venericardia compacta Tate sp.
Venericardia delicatula Tate sp.

Scaphopoda.—

Dentalium lacteolum Tate.

Gasteropoda.—

Eulima acutispira T.W.
Natica polita T.W. sp.
Turritella acricula Tate.

Turritella acinella, sp. nov.
Cerithiopsis cribarioides T.W. sp.
Pyrene balcombensis Pritch. sp.
Phos variciferus Tate.
Marginella winteri Tate.
Marginella micula Tate.
Marginella wentworthi T.W.
Marginella crassidens, sp. nov.
Conomitra othone T.W. sp.
Uromitra ralphii Cossm.
Turris optatus Harris sp.
Inquisitor integra T.W. sp.
Inquisitor sandleroides T.W. sp.
Buchozia hemiothone T.W. sp.
Bathytoma aff. *paracantha* T.W. sp.
Cylichnella infundibulata Cossm. sp.
Ringicula tenuilirata Tate.

Pisces.—
Otolith of teleostean, indet.

Depth, 1,215 feet.

Nature of Rock.—Grey marl.

Fossil Contents.—

Foraminifera.—
Biloculina bradyi Schl.
Spiroloculina dispansa, sp. nov.
Quinqueloculina vulgaris d'Orb.
Quinqueloculina schreiberiana d'Orb.
Quinqueloculina agglutinans d'Orb.
Cornuspira crassisepta Brady.
Textularia gibbosa d'Orb.
Clavulina cylindrica Hantk.
Nodosaria (*D.*) *obliqua* L. sp.

Anthozoa.—
Conosmilia striata Dunc.
Bathyactis lens Dunc. sp.
Trematotrochus fenestratus T.W. sp.
Mopsea tenisoni Chapm.

Echinodermata.—
Echinoid spines and plate, indet.

Polyzoa.—
Melicerita angustiloba Busk. sp.
Lunulites rutella T.W.
Selenaria marginata T.W.
Selenaria concinna T.W.
Adeona obliqua MacG.
Cellepora fossa Hasw. sp.
Retepora beaniana King.

Pelecypoda.—
Limopsis maccoyi Chapm.
Venericardia gracilicostata T.W. sp.
Venericardia compacta Tate sp.

Scaphopoda.—

Dentalium aratum Tate.

Gasteropoda.—

Natica polita T.W. sp.
Turritella platyspira T.W.
Turritella tristira Tate.
Marginella wentworthi T.W.
Marginella micula Tate.
Marginella globiformis sp. nov.
Mitrithara daphnelloides T.W. sp.
Ringicula lactea Johnston.
Semiactaeon microplocus Cossm.

Pisces.—

Fish tooth, indet.

Depth, 1,220 feet.

Nature of Rock.—Grey sandy marl.

Fossil Contents.—

Foraminifera.—

Biloculina depressa d'Orb.
Quinqueloculina linnaeana d'Orb sp.
Quinqueloculina agglutinans d'Orb.
Quinqueloculina vulgaris d'Orb.
Quinqueloculina lamarckiana d'Orb.
Quinqueloculina schreiberina d'Orb.
Cornuspira crassisepta Brady.
Textularia gibbosa d'Orb.
Spiroplecta gramen d'Orb. sp.
Nodosaria (D.) obliqua L. sp.

Echinodermata.—

Echinoid spine, indet.

Polyzoa.—

Cellaria contigua MacG.
Melicerita angustiloba Busk.
Adeona mucronata MacG.
Adeona obliqua MacG.
Bipora cancellata Busk sp.
Acropora gracilis M.Ed. sp.
Cellepora fossa Hasw. sp.

Pelecypoda.—

Arca (Barbatia) celleporacea Tate sp. (juv.).
Lissarca rubricata Tate sp.
Propeamusium atkinsoni Johnston sp.
Venericardia compacta Tate sp.

Scaphopoda.—

Dentalium subfissura Tate.

Gasteropoda.—

Nassarius tatei T.W. sp.
Leucozonia micronema Tate.
Marginella micula Tate.

Pisces.—
Fish otolith, indet.

Depth, 1,230 feet.

Nature of Rock.—Grey sandy marl.
Fossil Contents.—
Foraminifera.—
Biloculina bradyi Schl.
Spiroloculina dispansa, sp. nov.
Quinqueloculina vulgaris d'Orb.
Quinqueloculina agglutinans d'Orb.
Quinqueloculina lamarckiana d'Orb.
Cornuspira crassisepta Brady.
Spiroplecta sagittula Defr. var. *fistulosa* Brady
Anthozoa.—
Flabellum victoriae Dunc.
Polyzoa.—
Melicerita angustiloba Busk. sp.
Membranipora striata MacG.
Lunulites canaliculata Tate.
Selenaria maculata Busk.
Adeona obliqua MacG.
Acropora gracilis M.Ed. sp.
Retepora beaniana King.
Pelecypoda.—
Nuculana vagans Tate sp.
Lissarca rubricata Tate sp.
Propeamusium atkinsoni Johnst. sp.
Scaphopoda.—
Dentalium mantelli Zittel.
Gasteropoda.—
Triforis wilkinsoni T.W.
Nassarius tatei T.W. sp.
Marginella propinqua Tate.
Turris trilirata Harris sp. (juv.)
Ringicula lactea Johnston.
Cirripedia.—
Scalpellum (? Arcoscalpellum) meridianus, sp. nov.

Depth, 1,232 feet.

Nature of Rock.—Grey, sandy marl.
Fossil Contents.—
Foraminifera.—
Biloculina bradyi Schl.
Triloculina trigonula Lam. sp.
Spiroloculina dispansa, sp. nov.
Quinqueloculina vulgaris d'Orb.
Quinqueloculina schreiberiana d'Orb.
Quinqueloculina lamarckiana d'Orb.

Quinqueloculina agglutinans d'Orb.
Quinqueloculina ferussacii d'Orb.
Cornuspira crassisepta Br. sp.
Cornuspira involvens Rss. sp
Textularia gibbosa d'Orb. sp.
Spiroplecta sagittula d'Orb. sp.
Nodosaria (D.) obliqua L. sp.

Polyzoa.—

Melicerita angustiloba Busk. sp.
Cellaria rigida var. *venusta* MacG.
Cribrilina elevata MacG.
Adeona obliqua MacG.
Cellepora fossa Hasw. sp.

Pelecypoda.—

Cucullaea corioensis McCoy.
Lissarca rubricata Tate sp.
Trigonia tubulifera Tate.
Dimya dissimilis Tate.

Scaphopoda.—

Dentalium lacteolum Tate.

Gasteropoda.—

Turbonilla radicans, sp. nov.
Pyramidella polita Johnston.
Syrnola tincta Angas sp.
Natica polita Tate sp.
Turritella acinella, sp. nov.
Ancilla ligata Tate sp.
Cylichnella infundibulata Cossm. sp.

Depth, 1,240 feet.

Nature of Rock.—Greenish-grey, sandy marl, with shells.

Fossil Contents.—

Foraminifera.—

Biloculina bradyi Schl.
Spiroloculina dispansa, sp. nov.
Quinqueloculina vulgaris d'Orb.
Quinqueloculina linnaeana d'Orb sp.
Quinqueloculina schreiberiana d'Orb.
Quinqueloculina agglutinans d'Orb.
Quinqueloculina lamarckiana d'Orb.
Cornuspira striolata Br.
Gaudryina rugosa d'Orb.
Spiroplecta gramen d'Orb. sp.
Nodosaria (D.) soluta Rss.
Flabellina rugosa d'Orb.
Truncatulina mundula B.P. & J.
Truncatulina mundula B.P. & J. var. *carinata*, nov.
Operculina complanata Defr. sp.

Anthozoa.—
Placotrochus elongatus Dunc.
Trematotrochus fenestratus T.W.
Mopsea tenisoni Chapm.

Echinodermata.—
Echinoid spines, indet.

Polyzoa.—
Cellaria australis MacG.
Cellaria rigida MacG.
Melicerita angustiloba Busk.
Lunulites canaliculata MacG.
Selenaria marginata T.W.
Adeona obliqua MacG.
Adeona sp. (anchoring tubes).
Cellepora fossa Hasw. sp.

Pelecypoda.—
Limopsis maccoyi Chapm.
Dimya dissimilis Tate.
Venericardia compacta Tate sp.

Scaphopoda.—
Dentalium mantelli Zittel.

Gasteropoda.—
Teinostoma calva, sp. nov.

Ostracoda.—
Bairdia amygdaloides G.S.B.
Bairdia australis Chapm.

Pisces.—
Fish otoliths.

Depth, 1,254 feet.

Nature of Rock.—Grey sandstone, and some sandy marl with polyzoa and *Dentalium* sp.

Depth, 1,259 feet.

Nature of Rock.—Grey sand-rock, with polyzoa.

Fossil Contents.—

Foraminifera.—
Spiroloculina dispansa Chapm.
Quinqueloculina lamarckiana d'Orb.
Quinqueloculina linnaeana d'Orb. sp.
Quinqueloculina vulgaris d'Orb.
Quinqueloculina schreiberiana d'Orb.
Cornuspira crassisepta Brady.
Textularia gibbosa d'Orb.
Spiroplecta gramen d'Orb. sp.
Spiroplecta carinata d'Orb. sp.
Nodosaria (*D.*) *soluta* Rss.
Cristellaria rotulata Lam. sp.
Truncatulina ungeriana d'Orb. sp.
Truncatulina mundula B.P. & J.
Anomalina ammonoides Rss. sp.

Polyzoa.—
Amphiblestrum argus d'Orb. sp.
Adeona obliqua MacG.
Adeona grisea MacG.

Pelecypoda.—
Nucula obliqua Lam.
Limopsis maccoyi Chapm.
Arca (Plagiarca) cainozoica Tate.
Dimya dissimilis Tate.
Venericardia gracilicostata Tate sp.

Scaphopoda.—
Dentalium lacteolum Tate.

Gasteropoda.—
Emarginula transenna T.W.
Turritella acricula Tate.
Turritella acinella, sp. nov.
Turritella platyspira T.W.

Ostracoda.—
Aglaia clavata G.S.B.
Cythere normani G.S.B.
Cytherella subtruncata Chapm.
Cytherella punctata G.S.B.
Cytherella pulchra G.S.B.

Depth, 1,286 feet.

Nature of Rock.—Grey, sandy marl.

Fossil Contents.—

Foraminifera. —
Biloculina depressa d'Orb.
Biloculina bulloides d'Orb.
Biloculina bradyi Schl.
Quinqueloculina vulgaris d'Orb.
Quinqueloculina lamarckiana d'Orb.
Cornuspira striolata Brady.
Cornuspira crassisepta Brady.
Spiroplecta gramen d'Orb. sp.
Nodosaria (G.) laevigata d'Orb.
Nodosaria (D.) soluta Rss.
Truncatulina ungeriana d'Orb. sp.
Truncatulina mundula B.P. & J.
Truncatulina mundula B.P. & J. var. *carinata*, nov.
Pulvinulina auricula F. & M sp.

Anthozoa.—
Flabellum victoriae Dunc.
Notophyllia variolaris Denn.

Echinodermata.—
Alcyonarian spicules, indet.
Echinoid spines, indet.

Polyzoa.—
Adeona obliqua MacG.
Acropora gracilis M. Ed. sp. var. *vertebralis* Stol.

Pelecypoda.—

Callanaitis cainozoica T.W. sp.

Gasteropoda.—

Teinostoma calva, sp. nov.
Natica polita T.W.
Epigrus variciferus T.W. sp.
Turbonilla radicans, sp. nov.

Ostracoda.—

Cytherella auricula Chapm.

Depth, 1,295 feet.

Nature of Rock.—Grenish-grey marl, with shells.

Fossil Contents.—

Foraminifera.—

Biloculina sarsi Schl.
Biloculina bulloides d'Orb.
Quinqueloculina agglutinans d'Orb.
Quinqueloculina vulgaris d'Orb.
Quinqueloculina schreiberiana d'Orb.
Quinqueloculina lamarckiana d'Orb. sp.
Textularia abbreviata d'Orb.
Spiroplecta sagittula Defr. sp.
Nodosaria (*D.*) *obliqua* L. sp.
Nodosaria (*D.*) *multilineata* Born. sp.
Cristellaria cultrata Montf. sp.
Truncatulina ungeriana d'Orb. sp.
Truncatulina margaritifera Brady.
Truncatulina mundula B.P. & J.
Pulvinulina hauerii d'Orb. sp.
Polystomella macella F. & M. sp.

Echinodermata.—

Cidaroid spines, indet.

Polyzoa.—

Cellaria rigida var. *venusta* MacG.
Lepralia graysoni MacG.
Adeona obliqua MacG.

Pelecypoda.—

Nucula semistriata Tate.
Nuculana miliacea Hedley sp.
Nuculana vagans Tate sp.
Arca (*Barbatia*) *celleporacea* Tate sp.
cf. *Anomia* sp. (juv.).
Turritella acinella sp. nov.
Rissoa varicifera T.W.
Uromitra ralphii Cossm.

Ostracoda.—

Aglaia clavata G.S.B.
Bairdia foveolata G.S.B.
Cytherella auricula Chapm.
Cytherella punctata G.S.B.

Depth, 1,310 feet.

Nature of Rock.—Grey, sandy marl, with fractured surface showing *Adeona obliqua, Vaginella eligmostoma* and *Dentalium.*

Fossil Contents.—

Foraminifera.—

Spiroculina dispansa, sp. nov.
Quinqueloculina vulgaris d'Orb.
Cornuspira foliacea Phil.
Spiroplecta sagittula Defr. sp. var. *fistulosa* Brady.
Nodosaria (D.) soluta Rss.
Globigerina bulloides d'Orb.
Truncatulina ungeriana d'Orb. sp.
Truncatulina mundula B.P. & J.
Siphonina reticulata Cz. sp.
Pulvinulina elegans d'Orb. sp.

Anthozoa.—

Flabellum gambierense Dunc.
Bathyactis lens Dunc. sp.

Echinodermata.—

Plate of cidaroid, indet.
Spines of cidaroid (cf. *Goniocidaris prunispinosa* Chapm. and Cudm.)

Polyzoa.—

Cellaria contigua MacG.
Adeona obliqua MacG.
Acropora gracilis M.Ed. sp.
Cellepora fossa Hasw. sp.

Pelecypoda.—

Nuculana woodsi Tate sp.
Nuculana fontinalis Pritch. sp.
Nuculana miliacea Hedley sp.
Nuculana acuticauda Pritch. sp.
Dimya dissimilis Tate.
Corbula pyxidata Tate.

Scaphopoda.—

Dentalium subfissura Tate.

Gasteropoda.—

Natica polita T.W.
Epigrus variciferus T.W. sp.
Turritella acinella, sp. nov.
Cerithiella trigemmata, sp. nov.
Pyrene cainozoica T.W.
Conomitra ligata Tate sp.
Uromitra ralphii Cossm.
Mitrithara daphnelloides T.W. sp.
Cylichnella infundibulata Cossm. sp.
Vaginella eligmostoma Tate.

Ostracoda.—

Aglaia clavata G.S.B.
Argilloecia badia G.S.B.
Cytherella polita G.S.B.
Cytherella punctata G.S.B.
Cytherella intermedia, sp. nov.

Depth, 1,318 feet.

Nature of Rock.—Pale grey marl with shells.

Fossil Contents.—

Foraminifera.—

Biloculina bradyi Schl.
Biloculina depressa d'Orb.
Biloculina bulloides d'Orb.
Triloculina trigonula Lam. sp.
Quinqueloculina schreiberiana d'Orb.
Quinqueloculina vulgaris d'Orb.
Quinqueloculina lamarckiana d'Orb.
Quinqueloculina agglutinans d'Orb.
Cornuspira crassisepta Brady.
Cornuspira striolata Brady.
Spiroplecta gramen d'Orb. sp.
Clavulina communis d'Orb.
Nodosaria (D.) soluta Rss.
Orbulina universa d'Orb.
Truncatulina mundula B.P. & J.
Pulvinula elegans d'Orb sp.

Anthozoa.—

Mopsea tenisoni Chapm.

Echinodermata.—

Echinoid spines, indet.

Polyzoa.—

Adeona obliqua MacG.

Pelecypoda.—

Nuculana woodsi Tate sp.
Nuculana miliacea Hedley sp.

Gasteropoda.—

Turritella acinella, sp. nov.

Ostracoda.—

Argilloecia badia G.S.B.
Bairdia amydaloides G.S.B.
Cythere scintillulata G.S.B.
Cythere normani G.S.B.

Depth, 1,320 feet.

Nature of Rock.—Pale sandy marl with *Chlamys murrayanus.*

Fossil Contents.—

Foraminifera.—

Biloculina bradyi Schl.
Biloculina laevis Defr.
Biloculina bulloides d'Orb.
Quinqueloculina vulgaris d'Orb.
Quinqueloculina schreiberiana d'Orb.
Quinqueloculina lamarckiana d'Orb.
Cornuspira crassisepta Brady.
Cornuspira striolata Brady.
Spiroplecta sagittula Defr. sp.
Spiroplecta gramen d'Orb. sp.

Gaudryina rugosa d'Orb.
Clavulina communis d'Orb.
Truncatulina ungeriana d'Orb. sp.
Polystomella macella F. & M. sp.

Anthozoa.—
Conosmilia striata Dunc.

Echinodermata.—
Echinoid spines and plates, indet.

Polyzoa.—
Cribrilina terminata Waters.
Adeona obliqua MacG.
Adeona symmetrica MacG.

Pelecypoda.—
Nuculana woodsi Tate sp.
Nuculana vagans Tate sp.
Arca (Barbatia) crustata Tate.
Glycymeris gunyoungensis Chapm. & Singl.
Chlamys murrayanus Tate sp.
Dimya dissimilis Tate.
Corbula pyxidata Tate.

Scaphopoda.—
Dentalium aratum Tate.
Dentalium lacteolum Tate.

Gasteropoda.—
Teinostoma calva sp. nov.
Pyramidella polita Johnst.
Turritella acinella, sp. nov.
Cerithiopsis cribarioides T.W. sp.

Ostracoda.—
Bairdia australis Chapm.
Cythere scabrocuneata G.S.B.
Cytherella auricula Chapm.

Depth, 1,330 feet.

Nature of Rock.—Pale sandy marl with shells.

Fossil Contents.—

Foraminifera.—
Biloculina sarsi Schl.
Biloculina ringens Lam. sp.
Quinqueloculina lamarckiana d'Orb.
Quinqueloculina vulgaris d'Orb.
Quinqueloculina linnaeana d'Orb sp.
Cornuspira crassisepta Brady.
Cornuspira striolata Brady.
Haplophragmoides sphaeroidiniforme Brady sp.
Textularia abbreviata d'Orb.
Textularia gibbosa d'Orb.
Spiroplecta sagittula Defr. sp.
Spiroplecta gramen d'Orb. sp.
Cristellaria cultrata Montf. sp.
Truncatulina ungeriana d'Orb. sp.
Truncatulina mundula B.P. & J.

Echinodermata.—

Cidaroid plates and spines, including *Goniocidaris pentaspinosa* Chapm. & Cudm.

Polyzoa—

Adeona obliqua MacG.

Pelecypoda.—

Nuculana woodsi Tate sp.
Nuculana vagans Tate sp.
Limopsis maccoyi Chapm.
Venericardia scabrosa Tate sp.

Scaphopoda.—

Dentalium subfissura Tate.

Gasteropoda.—

Natica subnoae Tate.
Pyramidella polita Johnst. sp.
Turritella platyspira T.W.
Turritella acinella, sp. nov.
Murex trochispira Tate.
Conomitra ligata Tate sp.
Ancilla ligata Tate sp.
Cylichnella infundibulata Cossm. sp.

Depth, 1,333 feet.

Nature of Rock.—Greenish sandy marl with shells.

Fossil Contents—

Foraminifera.—

Quinqueloculina lamarckiana d'Orb.
Quinqueloculina vulgaris d'Orb.
Haplophragmoides sphaeroidiniforme Brady.
Textularia abbreviata d'Orb.
Textularia gibbosa d'Orb.
Clavulina communis d'Orb.
Nodosaria affinis d'Orb.
Nodosaria (*D.*) *soluta* Reuss.
Nodosaria aff. *costulata* Rss.
Cristellaria cultrata Montf. sp.
Orbulina universa d'Orb.
Globigerina inflata d'Orb.
Truncatulina ungeriana d'Orb. sp.

Echinodermata.—

Echinoid spine, inlet.

Polyzoa.—

Amphiblestrum argus d'Orb. sp.

Scaphopoda.—

Dentalium lacteolum Tate.

Gasteropoda.—

Rissoina lintea Hedley & May.
Ancilla ligata Tate sp.

Depth, 1,340 feet.

Nature of Rock.—Greenish sandy marl with shells.

Fossil Contents.—

Foraminifera.—

Biloculina sarsi Schl.
Biloculina bulloides d'Orb.
Quinqueloculina vulgaris d'Orb.
Quinqueloculina lamarckiana d'Orb.
Quinqueloculina schreiberiana d'Orb.
Cornuspira crassisepta Brady.
Haplophragmoides sphaeroidiniforme Brady sp.
Spiroplecta sagittula Defr. sp.
Cristellaria cultrata Montf. sp.
Cristellaria articulata Rss. sp.
Pulvinulina hauerii d'Orb. sp.

Anthozoa.—

Sphenotrochus emarciatus Dunc.

Echinodermata.—

Goniocidaris prunispinosa Chapm. & Cudm. (plate & spines)

Polyzoa.—

Cellaria contigua MacG.
Adeona obliqua MacG.

Pelecypoda.—

Venericardia scabrosa Tate sp.

Gasteropoda.—

Turbonilla tenuissima Hedley.
Turritella tristira Tate.
Filodrilla steiroides sp. nov.

Depth, 1,360 feet.

Nature of Rock.—Pale grey sandy marl, with polyzoa and shells.

Fossil Contents.—

Foraminifera.—

Biloculina bulloides d'Orb.
Spiroloculina dispansa, sp. nov.
Triloculina trigonula Lam. sp.
Quinqueloculina agglutinans d'Orb.
Cornuspira striolata Brady.
Cornuspira crassisepta Brady.
Clavulina communis d'Orb.
Orbulina universa d'Orb.
Globigerina triloba Rss.
Globigerina bulloides d'Orb.
Truncatulina mundula B.P. & J.
Truncatulina akneriana d'Orb. sp.
Truncatulina ungeriana d'Orb. sp.
Pulvinulina hauerii d'Orb. sp.

Anthozoa.—

Notophyllia gracilis Denn.

Echinodermata.—

Echinoid spines, indet.

Polyzoa.—
Melicerita sorrentae, sp. nov.
Adeona obliqua MacG.
Pelecypoda.—
Nuculana miliacea Hedley sp.
Nuculana fontinalis Pritch sp.
Ostrea sp. indet. (juv.).
Chlamys foulcheri T.W. sp.
Ostracoda.—
Bairdia australis Chapm.
Cythere quadriaculeata G.S.B.
Cythere ovalis G.S.B.
Cythere lactea G.S.B.
Cythere dictyon G.S.B.
Cythere normani G.S.B.
Cythere scabrocuneata G.S.B.
Cytherella araneosa, sp. nov.
Cytherella punctata G.S.B.
Cytherella polita G.S.B.

Depth, 1,376 feet.

Nature of Rock.—Grey sandy marl with shells.
Fossil Contents.—
Foraminifera.—
Triloculina tricarinata d'Orb.
Quinqueloculina vulgaris d'Orb.
Quinqueloculina lamarckiana d'Orb.
Cornuspira crassisepta Brady.
Textularia abbreviata d'Orb.
Clavulina communis d'Orb.
Anomalina ammonoides Rss. sp.
Anthozoa.—
Bathyactis lens Dunc. sp.
Echinodermata—
Goniocidaris prunispinosa Chapm. & Cudm.
Polyzoa.—
Cellaria contigua MacG.
Amphiblestrum regularis Maplestone sp.
Adeona obliqua MacG.
Pelecypoda.—
Arca (*Barbatia*) *crustata* Tate sp.
Venericardia gracilicostata T.W. sp.

Depth, 1,400 feet.

Nature of Rock.—Pale sandy marl with shells.
Fossil Contents.—
Foraminifera.—
Spiroloculina dispansa, sp. nov.
Quinqueloculina schreiberiana d'Orb.
Quinqueloculina vulgaris d'Orb.
Quinqueloculina lamarckiana d'Orb.

Quinqueloculina linnaeana d'Orb. sp.
Cornuspira striolata Brady.
Spiroplecta sagittula Defr. sp.
Spiroplecta sagittula Defr. sp. var. *fistulosa* Brady.
Nodosaria (*D.*) *obliqua* L. sp.
Nodosaria (*D.*) *soluta* Rss.
Rotalia orbicularis d'Orb.
Rotalia soldanii d'Orb.

Polyzoa.—
Adeona obliqua MacG.
Cellepora stellata Maplestone.

Pelecypoda.—
Limopsis maccoyi Chapm.
Venericardia gracilicostata T.W. sp.

Scaphopoda.—
Dentalium aratum Tate.

Gasteropoda.—
Turritella acinella, sp. nov.
Triforis wilkinsoni T.W.
Nassarius tatei T.W. sp.
Marginella kitsoni Chapm.
Cylichnella aratula Cossm. sp.

Ostracoda.—
Cytherella auricula Chapm.

Depth, 1,410 feet.

Nature of Rock.—Pale sandy marl with *Vaginella.*

Fossil Contents.—

Foraminifera.—
Quinqueloculina schreiberiana d'Orb.
Quinqueloculina linnaeana d'Orb sp.
Cornuspira involvens Rss. sp.
Clavulina communis d'Orb.
Nodosaria (*D.*) *soluta* Rss.
Cristellaria reniformis d'Orb.
Orbulina universa d'Orb.
Truncatulina mundula B.P. & J.

Anthozoa.—
Notophyllia gracilis Denn.

Echinodermata.—
Echinoid spines, indet.

Polyzoa.—
Selenaria marginata T.W.
Bipora philippinensis Busk sp.

Scaphopoda.—
Dentalium aratum Tate.

Gasteropoda.—
Teinostoma calva, sp. nov.
Pyramidella jonesiana Tate sp.
Turbonilla mulderi, sp. nov.

Turritella tristira Tate.
Turritella acinella, sp. nov.
Marginella micula Tate.
Conomitra ligata Tate sp.
Vaginella eligmostoma Tate.

Pisces.—

Otoliths of teleosteans, indet.

Depth, 1,426 feet.

Nature of Rock.—Pale grey marl with *Vaginella.*

Fossil Contents.—

Foraminifera.—

Quinqueloculina vulgaris d'Orb.
Quinqueloculina lamarckiana d'Orb. sp.
Haplogragmoides sphaeroidiniforme Brady sp.
Textularia abbreviata d'Orb.
Truncatulina mundula B.P. & J.

Polyzoa.—

Selenaria marginata T.W.
Acropora gracilis M. Ed. sp.
Cellepora fossa Hasw. sp.
Cucullipora tetrasticha MacG.

Pelecypoda.—

Arca (*Plagiarca*) *cainozoica* Tate sp

Scaphopoda.—

Dentalium mantelli Zittel.
Turritella tristira Tate.
Turritella acinella, sp. nov.
Marginella micula Tate.
Conomitra ligata Tate sp.
Vaginella eligmostoma Tate.

Depth, 1,446 feet

Nature of Rock.—Grey sandy marl.

Fossil Contents.—

Foraminifera.—

Quinqueloculina lamarckiana d'Orb.
Textularia abbreviata d'Orb.
Lagena orbignyana Seg. sp.
Cristellaria vortex d'Orb.
Orbulina universa d'Orb.
Truncatulina mundula B.P. & J.

Gasteropoda.—

Teinostoma calva, sp. nov.
Hauiakia gabrieli, sp. nov.
Turritella acinella, sp. nov.

Pisces.—

Fish remains, indet.

Depth, 1,461 feet.

Nature of Rock.—Pale grey marl with few shells.

Fossil Contents.—

Foraminifera.—

Biloculina bradyi Schl.
Biloculina elongata d'Orb.
Quinqueloculina vulgaris d'Orb.
Quinqueloculina schreiberiana d'Orb.
Quinqueloculina lamarckiana d'Orb.
Quinqueloculina agglutinans d'Orb.
Sigmoïlina sigmoidea Brady sp.
Cornuspira striolata Brady.
Haplophragmoides sphaeroidiniforme Brady, sp.
Textularia abbreviata d'Orb.
Spiroplecta gramen d'Orb. sp.
Clavulina communis d'Orb.
Lagena orbignyana Seg.
Nodosaria raphanus L. sp.
Nodosaria (D.) soluta Rss. sp.
Marginulina costata Batsch sp.
Sphaeroidina bulloides d'Orb.
Discorbina obtusa d'Orb. sp.
Truncatulina mundula B.P. & J.
Truncatulina ungeriana d'Orb. sp.

Anthozoa.—

Conosmilia striata Dunc.
Trematotrochus fenestratus T.W. sp.

Echinodermata.—

Echinoid spines, indet.

Polyzoa.—

Lunulites rutella T.W.
Selenaria marginata T.W.
Adeona obliqua MacG.
Retepora fissa MacG.

Gasteropoda.—

Natica hamiltonensis Tate.
Teinostoma calva, sp. nov.
Brookula singletoni, sp. nov.
Turbonilla constricta, sp. nov.
Turritella medioplicatilis, sp. nov.
Cerithiopsis reticosa, sp. nov.
Triforis wilkinsoni T.W.
Pyramidella polita Johnst. sp.
Nassarius tatei T.W. sp.
Marginella wentworthi T.W.

Ostracoda.—

Cytherella punctata G.S.B.

Depth, 1,465 feet.

Nature of Rock.—Pale grey marl.

Fossil Contents.—

Foraminifera.—

Quinqueloculina lamarckiana d'Orb.
Quinqueloculina vulgaris d'Orb.
Quinqueloculina polygona d'Orb.
Quinqueloculina schreiberiana d'Orb.
Quinqueloculina agglutinans d'Orb.
Cornuspira crassisepta Brady.
Textularia abbreviata d'Orb.
Cristellaria rotulata Lam. sp.
Truncatulina ungeriana d'Orb. sp.
Truncatulina mundula B.P. & J. var. *carinata* nov.

Anthozoa—

Notophyllia gracilis Denn.

Echinodermata.—

Cidaroid spines, indet.

Polyzoa.—

Acropora gracilis M.Ed. sp.

Scaphopoda.—

Dentalium aratum Tate.

Gasteropoda.—

Turritella acinella, sp. nov.
Turbonilla mulderi, sp. nov.
Cerithiella trigemmata, sp. nov.
Pyramidella polita Johnst. sp.

Ostracoda.—

Bairdia amygdaloides G.S.B.
Cythere dictyon G.S.B.
Cytherella punctata G.S.B.

Depth, 1,470 feet.

Nature of Rock.—Pale-grey marl.

Fossil Contents.—

Foraminifera.—

Triloculina trigonula Lam. sp.
Quinqueloculina schreiberiana d'Orb.
Quinqueloculina lamarckiana d'Orb.
Quinqueloculina vulgaris d'Orb.
Quinqueloculina linnaeana d'Orb sp.
Cornuspira foliacea Phil. sp.
Cornuspira crassisepta Brady.
Textularia abbreviata d'Orb.
Spiroplecta gramen d'Orb. sp.
Clavulina communis d'Orb.
Nodosaria (*G.*) *laevigata* d'Orb.
Nodosaria (*D.*) *obliqua* L. sp.
Nodosaria (*D.*) *soluta* Rss.

Cristellaria orbicularis d'Orb.
Orbulina universa d'Orb.
Globigerina triloba Rss.
Anomalina ammonoides Rss. sp.
Truncatulina mundula B.P. & J.
Truncatulina mundula B.P. & J. var. *carinata* nov.
Rotalia soldanii d'Orb.

Echinodermata.—

Echinoid spines, indet.

Polyzoa.—

Adeona obliqua MacG.
Acropora gracilis M.Ed. sp.

Pelecypoda.—

Venericardia compacta Tate sp.

Gasteropoda.—

Notogibbula sp. ind.
Turbonilla constricta, sp. nov.
Rissoina lintea Hedley & May.
Turritella platyspira T.W.
Turritella tristira Tate.

Ostracoda.—

Bairdia amygdaloides G.S.B.
Cytherella auricula Chapm.
Cytherella polita G.S.B.

Depth, 1,490.

Nature of Rock—Pale grey marl.

Fossil Contents.—

Foraminifera.—

Quinqueloculina vulgaris d'Orb.
Quinqueloculina schreiberiana d'Orb.
Quinqueloculina lamarckiana d'Orb.
Nodosaria (D.) obliqua L. sp.

Echinodermata—

Spines of *Goniocidaris prunispinosa* Chapm. & Cudm.

Polyzoa.—

Melicerita angustiloba Busk.
Selenaria marginata T.W.
Adeona obliqua MacG.
Acropora gracilis M.Ed. sp.
Cellepora fossa Hasw. sp.

Pelecypoda.—

Limopsis maccoyi Chapm.
Venericardia spinulosa Tate sp.

Gasteropoda.—

Turritella acinella, sp. nov.
Mitrithara conospira Tate sp.

Depth, 1,509 feet.

Nature of Rock.—Pale grey marl with polyzoa.

Fossil Contents.—

Foraminifera.—

Quinqueloculina schreiberiana d'Orb.
Cornuspira involvens Rss. sp.
Globigerina triloba Rss.
Truncatulina ungeriana d'Orb. sp.

Polyzoa.—

Cellaria australis MacG.
Acropora gracilis M.Ed. sp.
Retepora corioensis MacG.

Depth, 1,525 feet.

Nature of Rock.—Dark grey marl with polyzoa residue showing glauconite sand.

Fossil Contents.—

Foraminifera.—

Quinqueloculina schreiberiana d'Orb.
Quinqueloculina lamarckiana d'Orb.
Quinqueloculina agglutinans d'Orb.
Cornuspira involvens Rss. sp.
Gaudryina bradyi Cush.
Bulimina contraria Rss. sp.
Lagena orbignyana Seg. sp.
Marginulina costata Batsch. sp.
Cristellaria articulata Rss. sp.
Orbulina universa d'Orb.
Globigerina bulloides d'Orb.
Globigerina triloba Rss.
Truncatulina akneriana d'Orb. sp.
Truncatulina ungeriana d'Orb. sp.
Siphonina reticulata Cz. sp.

Polyzoa.—

Selenaria maculata Busk.
Selenaria marginata T.W.
Adeona clavata MacG.
Lunulites rutella T.W.

Gasteropoda.—

Turritella acinella, sp. nov.

Depth, 1,549 feet.

Nature of Rock.—Pale grey marl. Residue, after washing, contains glauconite sand, and pebbles of granite and quartz.

Fossil Contents.—

Foraminifera.—

Quinqueloculina agglutinans d'Orb.
Quinqueloculina lamarckiana d'Orb.
Cornuspira striolata Brady.
Cornuspira crassisepta Brady.
Haplophragmoides sphaeroidiniforme Brady sp.

Textularia abbreviata d'Orb.
Textularia gibbosa d'Orb.
Spiroplecta sagittula Defr. sp.
Nodosaria (D.) soluta Rss.
Cristellaria reniformis d'Orb.
Globigerina triloba Rss.
Truncatulina ungeriana d'Orb. sp.

Anthozoa.—
Mopsea sp. indet.

Polyzoa.—
Lunulites rutella T.W.

Gasteropoda.—
Rissoina lintea Hedley & May.
Odostomia deplexa Tate & May sp.

Ostracoda.—
Cytherella auricula Chapm.
Cytherella punctata G.S B.
Cytherella subtruncata Chapm.

Depth, 1,560 feet.

Nature of Rock.—Pale grey marl. Residue with glauconite sand, with small pebbles of (?) chalcedony.

Fossil Contents.—

Foraminifera.—
Triloculina tricarinata d'Orb.
Quinqueloculina vulgaris d'Orb.
Quinqueloculina lamarckiana d'Orb.
Quinqueloculina schreiberiana d'Orb.
Quinqueloculina agglutinans d'Orb.
Cornuspira crassisepta Brady.
Haplophragmoides sphaeroidiniforme Brady sp.
Ammodiscus incertus d'Orb.
Textularia abbreviata d'Orb.
Clavulina communis d'Orb.
Cristellaria articulata Rss.
Cristellaria rotulata Lam.
Polymorphina elegantissima P. & J.
Globigerina triloba Rss. sp.
Globigerina bulloides d'Orb.
Sphaeroidina bulloides d'Orb.
Truncatulina ungeriana d'Orb. sp.
Truncatulina mundula B.P. & J.
Pulvinulina auricula F. & M. sp.

Anthozoa.—
Sphenotrochus alatus Dunc.

Polyzoa.—
Lunulites rutella T.W.
Selenaria marginata T.W.
Selenaria concinna T.W.

Gasteropoda.—
Odostomia deplexa Tate & May sp.
Marginella micula Tate.

Ostracoda.—

Cytherella auricula Chapm.
Cytherella punctata G.S.B.
Cytherella pulchra G.S.B.

Depth, 1,580 feet.

Nature of Rock.—Pale grey sandy marl. Residue with glauconite sand and quartz pebbles.

Fossil Contents.—

Foraminifera—

Spiroloculina asperula Karr.
Quinqueloculina lamarckiana d'Orb.
Quinqueloculina schreiberiana d'Orb.
Quinqueloculina agglutinans d'Orb.
Quinqueloculina vulgaris d'Orb.
Sigmoïlina sigmoidea Brady sp.
Cornuspira foliacea Phil. sp.
Cornuspira striolata Brady.
Cornuspira crassisepta Brady.
Spiroplecta sagittula Defr. sp.
Clavulina communis d'Orb.
Nodosaria (D.) soluta Rss.
Pulvinulina auricula d'Orb. sp.

Anthozoa.—

Bathyactis lens Dunc. sp.
Mopsea sp.

Echinodermata.—

Goniocidaris prunispinosa Chapm. & Cudmore. (Spines).

Polyzoa.—

Cellaria rigida MacG.
Adeona obliqua MacG.

Pelecypoda.—

Nuculana acuticauda Pritch. sp.

Gasteropoda.—

Pyramidella polita Johnst. sp.

Depth, 1,608 feet.

Nature of Rock.—Pale green sandy marl, with shells.

Fossil Contents.—

Foraminifera.—

Biloculina bulloides d'Orb.
Triloculina tricarinata d'Orb.
Quinqueloculina vulgaris d'Orb.
Quinqueloculina lamarckiana d'Orb.
Quinqueloculina schreiberiana d'Orb.
Cornuspira striolata Brady.
Cornuspira involvens Brady.
Textularia gibbosa d'Orb.
Spiroplecta sagittula Defr. sp.
Clavulina communis d'Orb.
Gaudryina bradyi Cush.

Nodosaria raphanus L. sp.
Cristellaria cultrata Montf. sp.
Truncatulina ungeriana d'Orb. sp.
Pulvinulina hauerii d'Orb. sp.

Echinodermata.—
Echinoid spines, indet.

Vermes.—
Serpula sp.
Cellaria contigua MacG.
Cellaria rigida MacG. var. *perampla* Waters.
Cellaria australis MacG.
Adeona obliqua MacG.

Pelecypoda.—
Nucula morundiana Tate.
Dimya dissimilis Tate.
Venericardia delicatula Tate sp.

Scaphopoda.—
Dentalium aratum Tate.

Ostracoda.—
Cythere scintillulata G.S.B.
Cytherella lata G.S.B.
Cytherella polita G.S.B.

Depth, 1,615 feet.

Nature of Rock—Pale greenish sandy marl, with shells.

Fossil Contents.—

Foraminifera.—
Biloculina bradyi Schl.
Quinqueloculina vulgaris d'Orb.
Quinqueloculina lamarckiana d'Orb.
Quinqueloculina schreiberiana d'Orb.
Sigmoïlina celata Costa sp.
Cornuspira striolata Brady.
Textularia gibbosa d'Orb.
Textularia abbreviata d'Orb.
Spiroplecta sagittula Defr. sp.
Spiroplecta nussdorfensis d'Orb. sp.
Nodosaria (D.) obliqua L. sp.

Echinodermata.—
Test fragments, indet.

Vermes.—
Serpula sp.

Polyzoa.—
Crisia scalaris MacG.
Cellaria rigida MacG. var. *perampla* Waters.
Bipora philippinensis Busk sp.
Bitectipora lineata MacG.
Acropora gracilis M.Ed. sp.
Cellepora fossa Hasw. sp.

Pelecypoda.—
Nucula morundiana Tate.
Nucula obliqua Lam.
Nuculana miliacea Hedley sp.

Pinctada crassicardia Tate sp.
Lima sp. indet. (juv.).
cf *Anomia* sp. (juv.)
Venericardia compacta Tate sp.
Clausinella shelfordensis, sp. nov.

Scaphopoda.—

Dentalium lacteolum Tate.

Gasteropoda.—

Natica polita T.W.
Turbonilla radicans, sp. nov.
Turritella tristira Tate.
Cerithiella trigemmata, sp. nov.
Eucithara bidens T.W. sp.
Cylichnella angustata Tate & Cossm. sp.

Ostracoda.—

Bairdia amygdaloides G.S.B.
Cytherella polita G.S.B.

Pisces.—

Otolith of fish, indet.

Depth, 1,640 feet.

Nature of Rock.—Grey marl, with gasteropods (*Conus*).

Fossil Contents.—

Foraminifera.—

Quinqueloculina lamarckiana d'Orb.
Quinqueloculina schreiberiana d'Orb.
Quinqueloculina vulgaris d'Orb.
Haplophragmoides sphaeroidiniforme Brady sp.
Spiroplecta sagittula Defr. sp.
Truncatulina ungeriana d'Orb. sp.
Truncatulina mundula B.P. & J.
Anomalina ammonoides Rss. sp.
Pulvinulina elegans d'Orb. sp.
Nonionina pompilioides F. & M. sp.

Echinodermata.—

Echinoid spine, indet.

Gasteropoda.—

Conus sp.

Pisces.—

Coprolites of (?) fish.
Otolith of fish, indet.

Depth, 1,658 feet.

Nature of Rock.—Grey marl, with polyzoa (*Adeona*).

Fossil Contents.—

Foraminifera.—

Biloculina bulloides d'Orb.
Quinqueloculina vulgaris d'Orb.
Quinqueloculina lamarckiana d'Orb.
Quinqueloculina agglutinans d'Orb.
Cornuspira crassisepta Brady.
Cornuspira striolata Brady.

Textularia abbreviata d'Orb.
Spiroplecta sagittula Defr. sp.
Spiroplecta gramen d'Orb. sp.
Spiroplecta carinata d'Orb. sp.
Nodosaria (D.) soluta Rss.
Truncatulina ungeriana d'Orb. sp.

Anthozoa.—
Notophyllia gracilis Denn.

Echinodermata.—
Echinoid spine, indet.

Polyzoa.—
Hornera prominens MacG.
Hornera frondiculata MacG.
Amphiblestrum spathuloides, sp. nov.
Adeona obliqua MacG.
Schizoporella submersa Waters.

Gasteropoda.—
Pyramidella polita Johnst. sp.
Nassarius tatei T.W. sp.

Ostracoda.—
Cytherella polita G.S.B.

Depth, 1,667 feet.

Nature of Rock.—Pale grey sandy marl, with minute shells.

Fossil Contents.—

Foraminifera.—
Quinqueloculina lamarckiana d'Orb.
Quinqueloculina vulgaris d'Orb.
Cornuspira striolata Brady.
Haplophragmoides sphaeroidiniforme Brady sp.
Spiroplecta gramen d'Orb. sp.
Spiroplecta sagittula Defr. sp.
Nodosaria (D.) obliqua L. sp.
Cristellaria cultrata Montf. sp.
Cristellaria elongata d'Orb.
Pulvinulina elegans d'Orb. sp.
Nonionina pompilioides F. & M. sp.

Anthozoa.—
Trematotrochus fenestratus T.W. sp.
Notophyllia gracilis Denn.

Echinodermata.—
Goniocidaris prunispinosa Chapm. & Cudm. (Spines).

Polyzoa.—
Adeona grisea Lam.

Gasteropoda.—
Turritella platyspira T.W.
Turritella tristira Tate.
Triforis wilkinsoni T.W.

Ostracoda.—
Cytherella polita G.S.B.

Depth, 1,680 feet.

Nature of Rock.—Grey sandy marl, with *Nucula.*

Fossil Contents.—

Foraminifera.—

Biloculina bulloides d'Orb.
Triloculina trigonula Lam. sp.
Quinqueloculina vulgaris d'Orb.
Quinqueloculina lamarckiana d'Orb.
Quinqueloculina agglutinans d'Orb.
Miliolina trigonula Lam. sp.
Sigmoïlina sigmoidea Brady.
Cornuspira striolata Brady.
Cornuspira crassisepta Brady.
Haplophragmoides sphaeroidiniforme Brady sp.
Textularia abbreviata d'Orb.
Spiroplecta sagittula Defr. sp.
Spiroplecta nussdorfensis d'Orb. sp.
Clavulina angularis d'Orb.
Nodosaria (G.) laevigata d'Orb.
Nodosaria (D.) soluta Rss.
Nodosaria (D.) multilineata Born.
Cristellaria articulata Rss. sp.
Globigerina triloba Rss.
Globigerina bulloides d'Orb.
Spirillina inaequalis Brady sp.
Truncatulina ungeriana d'Orb. sp.
Truncatulina mundula B.P. & J.
Anomalina ammonoides Rss. sp.

Polyzoa.—

Adeona symmetrica Waters sp.

Pelecypoda.—

Nucula obliqua Lam.

Gasteropoda.—

Pyramidella polita Johnst. sp.
Turritella platyspira T.W.

Ostracoda.—

Cytherella polita G.S.B.
Cytherella lata G.S.B.
Cytherella subtruncata Chapm.

Depth, 1,693 feet.

Nature of Rock.—Grey sandy marl.

Fossil Contents.—

Foraminifera.—

Quinqueloculina lamarckiana d'Orb.
Quinqueloculina vulgaris d'Orb.
Quinqueloculina schreiberiana d'Orb.
Quinqueloculina agglutinans d'Orb.
Sigmoïlina sigmoidea Brady.
Cornuspira foliacea Phil. sp.
Cornuspira striolata Brady.
Textularia abbreviata d'Orb.

Clavulina angularis d'Orb.
Cristellaria cultrata Montf. sp.
Globigerina bulloides d'Orb. sp.
Truncatulina ungeriana d'Orb. sp.
Truncatulina lobatula W. & J. sp.
Truncatulina mundula B.P. & J.

Echinodermata.—

Echinoid spine, indet.

Polyzoa.—

Cellaria rigida MacG. var. *perampla* Waters.
Amphiblestrum spathuloides, sp. nov.
Steganoporella magnilabris Busk sp.

Gasteropoda.—

Turbonilla tenuissima Hedley
Triforis wilkinsoni T W.
Inquisitor integra T.W. sp.

Ostracoda.—

Cytherella auricula Chapm.

III.—DESCRIPTION OF NEW OR RARE SPECIES.

(*F. Chapman and I. Crespin.*)

Phylum PROTOZOA.

Class RHIZOPODA.

Order FORAMINIFERA.

Fam. Miliolidae.

Genus SPIROLOCULINA d'Orbigny.

Spiroloculina dispansa sp. nov. Plate I., Fig. 1.

Description.—Test depressed, ovately to roundly rhomboid; the last chamber produced aborally, with the oral aperture situated on a slender, produced, and smooth neck. Orifice nearly circular, the opening divided by a small T-shaped process. Periphery of test grooved or costate, the costae not always parallel with the extreme edge. As many as six chambers visible on either side of the median lateral axis. Costae sharp and keel-like on last chamber of holotype numbering 4, on paratype 2.

Dimensions.—Length of Holotype, 2.9 mm.; width, 2.3 mm.; height of apertural tube, 27 mm.

Observations.—This species, although rather variable in colour, is distinguishable from *Quinqueloculina linnaeana* d'Orbigny by its expanded and spiroloculine test. In the lowest part of the bore, however, it merges into its milioline isomorph *Q. linnaeana*. In general appearance it may be compared with Cushman's *Spiroloculina grata* var. *angulata* (Cushman 1917, p. 36, pl. VII., fig. 5). Whilst agreeing in its broad complanate test with sharp longitudinal costae, *S. dispansa* is quite distinct in its completely fused sutures, which in *S. grata* and var. *angulata* are in places dehiscent. In Cushman's variety, moreover, the apertural neck is costate, and the tooth is a simple projection.

Distribution in Bore.—605 feet, common; 630 feet, common; 640 feet, frequent; 660 feet, frequent; 661 feet, very rare; 690 feet, very rare; 719 feet, rare; 730 feet, rare and small; 741 feet, frequent; 758 feet, very rare; 902 feet, very rare and small; 976 feet, rare and large; 1,138 feet, very rare; 1,158 feet, very rare; 1,170 feet, common; 1,180 feet, rare; 1,191 feet, very rare; 1,204 feet, frequent; 1,215 feet, frequent; 1,230 feet, very rare; 1,232 feet, rare and small; 1,240 feet, rare and small; 1,259 feet, rare; 1,310 feet, very rare; 1,360 feet, very rare; 1,400 feet, rare.

Fam. Lagenidae.

Genus FRONDICULARIA Defrance.

Frondicularia nuda sp. nov. Plate I., Fig. 2.

Description.—Test compressed, long-ovate, acuminate at extremity, rounded primordially; peripheral edge carinate, the portion surround-

ing the embryonic chamber being split up into spinous projections. Sutures flush with surface, the latter faintly marked with numerous vertical striae.

Dimensions.—Length of test, 3 mm.; greatest width, 1.16 mm.

Observations.—This species bears some relationship to *F. lorifera* Chapman (1913, p. 171, pl. XVI., fig. 6), but it does not have prominent and secondarily thickened sutural walls as in that species. In outline the present form resembles Costa's *F. inaequalis* (Costa 1857, p. 372, pl. III., fig. 3, and Chapman 1926, p. 55, pl. III., fig. 43).

Distribution in Bore.—1,088 feet. (Type specimen.)

Genus MARGINULINA d'Orbigny.

MARGINULINA COSTATA Batsch sp.

Marginulina costata Batsch sp. Brady 1884, p. 538, pl. LXV., fig. 10-13. Chapman 1926, p. 56, pl. III., fig. 49, 51, 54.

Observations.—The example here figured is a typical and well-grown specimen. The species is usually indicative of fairly deep and clear water, especially when of the dimensions of the present example.

Distribution in Bore.—1,461 feet, in pale grey marl.

Genus CRISTELLARIA Lamarck.

CRISTELLARIA ELONGATA d'Orbigny. Plate I., Fig. 3.

Cristellaria elongata d'Orbigny, 1826, p. 292, No. 11; Fornasini, 1883, p. 187, pl. II., figs. 8*a, b;* Heron-Allen and Earland, 1924, p. 159; Chapman and Parr, 1926, p. 388, pl. XX., fig. 60.

Observations.—This fine specimen of the *C. crepidula* type is represented in the bore by three specimens. It has been previously recorded from the Victorian Tertiaries in the Oligocene (Balcombian) of the Altona coal seam and in the Janjukian or Batesfordian phase of the Batesford Limestone (Miocene).

Distribution in Bore.—1,667 feet, in pale grey sandy marl.

Fam. ROTALIIDAE.

Genus TRUNCATULINA d'Orbigny.

TRUNCATULINA MUNDULA Brady, Parker & Jones.

Truncatulina sp.—Intermediate form near *Truncatulina haidingeri* d'Orb sp., H. B. Brady, 1884, pl. XCV., fig. 6.

Truncatulina mundula Brady, Parker and Jones, 1888, p. 228, pl. XLV., fig. 25.

Planorbulina mundula Brady, Parker and Jones, sp., Goës 1896, p. 71.

Truncatulina mundula Brady, Parker and Jones, Bagg, 1908, p. 158, Cushman 1915, p. 41, pl. XIII., fig. 4 (text figs. 45*a-c*).

Observations.—The above species was first figured by Dr. Brady as a doubtful *T. haidingeri.* It is particularly common in soundings from the coast of Australia, and in the fossil condition has occurred in the Tertiaries of the Victorian Mallee bores (recorded as *T. haidingeri*).

Other recorded occurrences are by Bagg, from the Hawaiian Islands, 104-213 fathoms, and by Goës in the western tropical Pacific, 695 and 1,218 fathoms.

Distribution in Bore.—585 feet, very rare; 623 feet, frequent; 630 feet, very rare and small; 654 feet, rare and small; 660 feet, very rare and small; 661 feet, common and small; 670 feet, very rare and small; 674 feet, rare; 690 feet, very rare and small; 694 feet, rare and small; 719 feet, rare and small; 726 feet, rare and small; 730 feet, very rare and small; 746 feet, rare and small; 786 feet, very rare; 800 feet, rare and small; 902 feet, very rare and small; 938 feet, common and small; 976 feet, rare; 995 feet, frequent; 997 feet, frequent; 1,025 feet, common; 1,034 feet, common and large; 1,050 feet, very rare; 1,088 feet, rare; 1,138 feet, common and small; 1,164 feet, common; 1,240 feet, frequent and large; 1,259 feet, frequent and small; 1,295 feet, frequent and small; 1,310 feet, very rare and small; 1,318 feet, rare; 1,360 feet, common; 1,410 feet, very common and large; 1,426 feet, common and large; 1,446 feet, very common and large; 1,461 feet, very rare, large; 1,470 feet, very rare and large; 1,560 feet, very rare; 1,640 feet, very rare; 1,680 feet, rare and small; 1,693 feet very rare. The figured specimen is from 1,446 feet.

TRUNCATULINA MUNDULA Brady, Parker and Jones, var. CARINATA, nov. Pl. II., Fig. 6.

Description.—Test as in the type species, biconvex, but with the peripheral series of chamber compressed, so that the edge of the shell is distinctly carinate.

Dimensions of figured Holotype of variety.—.77 mm. in diameter.

Observations.—This variety is usually of smaller dimensions than the specific form, and may indicate a depauperation of the test in its later stages.

Distribution in Bore.—938 feet, rare; 990 feet, rare; 995 feet, very rare; 1,050 feet, very rare; 1,060 feet, frequent; 1,088 feet, common; 1,107 feet, very rare; 1,164 feet, very rare; 1,220 feet, very rare and large; 1,240 feet, very rare and large; 1,286 feet, frequent and small; 1,465 feet, very rare and small; 1,470 feet, very rare and small.

Phylum COELENTERATA.

Class ANTHOZOA.

Order **MADREPORIA.**

Fam. ASTRAEIDAE.

Genus **PARASMILIA** Edward & Haime.

PARASMILIA LUCENS Dennant. Pl. II., Fig. 7.

Parasmilia lucens Dennant, 1904, p. 64, pl. XXIV., Fig. 6*a-c*.

Observations.—The only example found in the Sorrento Bore shows about half of the corallum from the base upward. The cross section of the cup so exposed shows only the first three systems of septa, whilst the epithecal wall is comparatively thick and has the epithecal surface

marked with fine granulations arranged in vertical lines. The pedicellate base is spreading and was evidently attached to a shell or other organic body.

The type specimens came from Brown's Creek, Aire River District, Cape Otway, to which locality it has hitherto been restricted. This series is at the base of the Janjukian.

Distribution in Bore.—902 feet, in grey sand rock.

Sub Class ALCYONARIA.

Fam. PENNATULIDAE.

Genus GRAPHULARIA Edward & Haime.

GRAPHULARIA KALIMNAE sp. nov. Plate II., Figs. 8*a-c.*

Description.—Calcareous axis slender, of unknown length, subcircular in section, showing a central partially calcified core, surrounded by radiating calcareous spicules or needles arranged in zones. Surface of axis nearly always black, due to the thin carbonized, originally chitinous, layer.

Dimensions of Holotype.—Length of axis (incomplete), 15 mm.; greatest width of axis, 3 mm.

Comparisons.—This species is easily distinguished from *Graphularia senescens* Tate sp., a typically Janjukian form, in its more rounded sectional aspect, in the generally slender character, and in its smaller size. Many examples of *G. senescens* have flattened or even concave sides, a character apparently absent from *G. kalimnae.*

Distribution in Bore.—605 feet, abundant; 674 feet, rare.

Phylum ECHINODERMATA.

Class ECHINOIDEA.

Fam. CIDARIDAE.

Genus GONIOCIDARIS L. Agassiz & Desor, 1846.

GONIOCIDARIS PRUNISPINOSA Chapman and Cudmore.[1] Plate XI., Figs. 73*a-l.*

Description.—Test (interambulacral plates), from Balcombe Bay. The two rows of primary tubercles are set close together with very little intermediate area, which is occupied by a sinuous groove. The margin of the separate tubercle plates is more expanded than in *G. pentaspinosa,* and the fine miliaries of the precinct are scattered rather than ring-like in arrangement. The mamelon is feebly tuberculate. Similar plates are found at Clifton Bank, Muddy Creek.

Approximate diameter of the Balcombe Bay test, when complete, 13 mm. Dimensions of test fragments—area of primary tubercle plate, 3.5 mm. in diameter. The diameter of the mamelon is .75 mm.

---

[1]. This and the following description were prepared for a paper to be subsequently published on this group by the above authors, but are now inserted here to obviate the publication of MS. names.

Spines (Balcombe Bay specimens).—These are chiefly of a long slender, delicate type with fairly distant, usually very sharp, spinules. The shaft of the spine is rounded to elliptical. The spinules are disposed along the shaft at various angles from the horizontal to the acute. A variant of these spines shows the thorns coalescent, and forming a wing on each side of the spine. Some other examples are closely clothed with short stout thorns resembling the armature on a knobkerrie. Another variant shows the coalescence of the thorns to form a sheath around the tip of the spine. Length of spines average two and a half times the approximate diameter of the test, or 32.5 mm.

Spines (Grice's Creek specimens).—Typical spines of the above species are found here, but they are rare as compared with the more delicate and angular spines of the succeeding species. These spines are of the same build and slender character as those from Balcombe Bay, but a large proportion of them are pentagonal in section, and the surfaces are finely but distinctly striated. The thorns on these spines are just as numerous as in the Balcombe Bay specimens, but are shorter. Two plates (primary tubercles) occur at this locality of Grice's Creek, and apparently show the same characters as those from Balcombe Bay.

Spines from Altona Bay.—These are of the same character as those from Balcombe Bay, but if anything having larger thorns; whilst those spines with cup-shaped terminations are more commonly met with there than at Balcombe Bay.

Spines from other Localities.—These include Clifton Bank, Muddy Creek (Balcombian); lower bed, Mitchell River (Janjukian); Gellibrand River (Janjukian); Native Hut Creek and Shelford (Janjukian); Neumerella (Janjukian); Forsyth's, Muddy Creek (Kalimnan).

GONIOCIDARIS PENTASPINOSA Chapman and Cudmore.

Plate XI., Figs. 74*a-g*.

Description.[1]—Plates of the test.—The remains of interambulacral plates are found associated with this species at Grice's Creek. They differ from the preceding species in that the area surrounding the mamelon is more restricted and circular, and that the granules of the precinct are arranged in ring fashion. The ambulacral pores are typically bare and sunken as in the living examples of the genus.

Characters of the Spines.—These are invariably longer and more slender than those of the preceding species, and seem to be always pentagonal, or occasionally diagonal in section. The surface of the spine is finely but distinctly striated. The spinulose character varies from mere punctae to short spinules, but these latter are invariably arranged in series as compared with the preceding species. Towards the base the spinules are more accentuated and salient.

Dimensions of Spines.—Locality of Grice's Creek, length of adult spine, 34 mm.; width of shaft of adult spine at the base, 2 mm.

Localities.—Grice's Creek (F. A. Cudmore and Nat. Mus.), Balcombe Bay (F.A.C. and Nat. Mus.), Altona Bay Coal Shaft (T. S.

[1] This is a preliminary description. There are complete tests of this species from Bird Rock and Lower Murray Cliffs.

Hall); Balcombian: Gellibrand River (T. S. Hall), Murghebuloc (T.S.H. and F.A.C.), Skinner's, Mitchell River (F.A.C.), Neumerella (test fragments and spines, F Chapman), Lower Murray River Cliffs, S.A. (test, type, Nat. Mus. Coll. Thatcher), near Bird Rock, Torquay, polyzoal rocks on beach (test, F.A.C.), Longford (test fragments, T.S.H.), Jan Juc Creek (test fragments, T.S.H.), Morgan, Murray River, S.A. (test, fragments, Nat. Mus. pres. A. King), Murray Bridge, S.A. (test fragments, F.A.C.), 4 miles below Morgan, S.A. (F.A.C.), Pelican Point below Morgan, S.A. (F.A.C.), Knight's Siding Stone Quarry, near Mount Gambier, S.A. (F.A.C.).

Phylum MOLLUSCOIDEA.

Class POLYZOA.

Order CHEILOSTOMATA.

Fam. Cellariidae.

Genus MELICERITA M. Edwards.

Melicerita sorrentae, sp. nov. Plate II., Fig. 9.

Description.—Zoarium consisting of compressed bilaminate branches. Zooecia rhomboidal, situated in transverse rows with elevated margins. Surface of zooecia flat, smooth, and depressed. Thyrostome situated near the top of the zooecial area, arched above, straight below; the lower edge with two denticles.

Dimensions.—Width of branch, 2.4 mm. Height of zooecium, 54 mm. Width of thyrostome, .173 mm.; height of thyrostome, .115 mm.

Observations.—The present species is distinct from *M. acutimarginata* MacGillivray (1895, p. 28, pl. III., fig. 17) in having a rhomboidal outline to the zooecia instead of hexagonal. The lower edge of the thyrostome in each species is similarly denticulate. From *Cellaria rigida* MacGillivray (1895, p. 29, pl. III., fig. 20-24) it differs in having broader zooecia and more expansive branches. Maplestone (1901, p. 183, pl. XXII., fig. 1) has figured a fine new species under the name of *C. grandis,* but that form has a large ovicell beneath the zooecial opening; but the present form in having a flattened zoarium is a true *Melicerita.*

Distribution in Bore.—1,360 feet, 3 examples.

Fam. Membraniporidae.

Genus AMPHIBLESTRUM Gray.

Amphiblestrum ctenostoma, sp. nov. Plate I., Fig. 4.

Description.—Zoarium encrusting. Zooecia ovately-rhomboid, with the upper margin wide; area round margin concavely depressed, and with granulate surface; margin of thyrostome finely toothed.

Dimensions.—Height of zooecia, .6 mm.; greatest width of zooecia, .46 mm. Width of thyrostome, .25 mm.

Comparisons.—In the concave zooecial border of the thyrostome *Membranipora aperta* Busk (1859, p. 33, pl. III., fig. 13) resembles the above form, but the shape of the zooecium in Busk's species is a quadrate oval and not subangulate as in ours.

Amphiblestrum arethusa d'Orbigny sp. (see MacGillivray 1895, p. 41, pl. V., fig. 21) somewhat approaches the present species, especially in the depressed and granulate character of the zooecial area, but has a smaller and more ovate thyrostome which is without the characteristic comb-like margin seen in *A. ctenostoma*.

Distribution in Bore.—1,025 feet, in grey sandy marl with shells and polyzoa.

AMPHIBLESTRUM SPATHULOIDES, sp. nov. Plate I., Fig. 5.

Description.—Zoarium branching, depressed, bilaminate. Zooecia alternate in vertical series. Borders of zooecia with a thin cord-like margin; spoon-shaped or pear-shaped; the area surrounding the thyrostome, inflated and finely pitted.

Dimensions.—Length of type specimen, 6 mm.; width, 2.3 mm.; width of thyrostome, .27 mm.

Comparisons.—This species bears a general resemblance to *A. regularis* Maplestone sp. (*Membranipora regularis* Maplestone, p. 187, pl. XXIV., fig. 10), but the zooecia are more rhomboidal and distinctly spatulate in form, those of *A. regularis* being more angulate and subhexagonal. The branches in the above species are also broader and more depressed.

Distribution in Bore.—1,658 feet, in grey marl with polyzoa; 1,693 feet, in grey sandy marl.

Fam. CELLEPORIDAE.

Genus CELLEPORA Fabricius.

CELLEPORA STELLATA Maplestone. Plate III., Fig. 11.

Cellepora stellata Maplestone 1903, p. 142, pl. XVI., fig. 6.

Observations.—This species was formerly described by Maplestone from two Barwonian localities, viz., Orphanage Hill, Geelong, and Campbell's Point, Lake Connewarre. The produced zooecia, which are depressed in front, and their radiate disposition distinguishes the present species from the smaller examples of *C. fossa* Haswell sp. (MacGillivray 1895, p. 108, pl. XIV., fig. 810).

Distribution in Bore.—1,204 feet, in grey sandy marl; 1,400 feet, in pale sandy marl with shells; 1,446 feet, in grey sandy marl.

Class BRACHIOPODA.

Fam. TEREBRATELLIDAE.

Genus MALLEIA Thomson.

MALLEIA PLANIDORSATA, sp. nov. Plate II., Figs. 10*a-d*.

Description.—Shell small, sub-circular in outline but for the rostrum, which is only moderately prominent. Ventral valve with surface strongly convex, depressed on either side of rostrum; marked by a few growth lines which are crossed by numerous fine and distinct radii. Dorsal valve sub-circular, hinge-line nearly straight. Delthyrium comparatively small, triangular, higher than broad. In edge view the united valves show a plano-convex section.

Dimensions.—Length, 4.5 mm.; width, 4 mm. Thickness of shell, 1.5 mm.

Observations.—The nearest species to the above is *Malleia "Terebratella" portlandica* Chapman (1913, p. 187, pl. XVIII., fig. 36-38). It has a similarly flat dorsal valve, but there is no posterior sinus as in *M. portlandica,* which occurs at Portland (Janjukian) and Beaumaris (Kalimnan).

Distribution in Bore.—618 feet, in calcareous sand-rock (one example, with united valves); 623 feet, in grey calcareous sand-rock (numerous specimens, chiefly dorsal valves).

Phylum MOLLUSCA.

Class PELECYPODA.

Fam. NUCULANIDAE.

Genus NUCULANA Link.

NUCULANA FONTINALIS Pritchard sp.

Leda fontinalis Pritchard 1901, p. 28, pl. III., fig. 3, 3A.

Observations.—A number of small examples of *Nuculana* from the Sorrento Bore were at first relegated to the above species, but a critical examination showed them to belong to *N. miliacea* of Hedley, a form still living in fairly deep water off the coast of New South Wales.

N. fontinalis of Pritchard is a rather restricted species, occurring at Torquay in company with the next species referred to, viz., *N. miliacea* Hedley. *N. fontinalis* therefore seems to be a local variant of a well-defined species having an enormous geological history, for *N. miliacea* ranges from Balcombian to Recent.

The records of Dennant and Kitson for *N. fontinalis* (Dennant and Kitson 1903, p. 122) require to be revised, for judging from specimens in the Dennant collection (in the National Museum) the only locality which shows typical *N. fontinalis* is Spring Creek, Torquay. The localities for the other specimens in that collection labelled *"Leda fontinalis"* will be given under the description of *Nuculana miliacea.*

Distribution in Bore.—630 feet in greenish sand-rock with shells; 758 feet, in greenish-grey marl; 1,310 feet, in grey sandy marl with shells; 1,360 feet, in grey sandy marl with polyzoa and shells.

NUCULANA MILIACEA Hedley sp.

Leda miliacea Hedley, 1902, p. 295, fig. 43, Id., 1905, p. 42.

Comitileda miliacea Hedley sp., Iredale 1924, p. 185.

Observations.—The description given by the late Mr. Chas. Hedley so well applies to our small rostrate form of Pritchard's *N. fontinalis* type that there can be no hesitation in accepting this living species as occurring as far down in the Tertiaries as the Balcombian.

Hedley's description is as follows:—"Shell small, solid, rather inflated, anterior side the longer, posterior slightly rostrate, umbo prominent. Externally smooth and glossy, with faint growth striae. Colour, pale yellow. Teeth of the pattern of *L. crassa,* 9 on the posterior, 12 on the anterior side. Length, 2.25; height, 1.5 mm."

Iredale has suggested (*loc. supra cit.*) the new generic name *Comitileda* for this "peculiar little smooth species," but a study of the palaeontological variants of this form preclude its acceptance, for it is seen to oscillate towards typical *Nuculana* in the same zone.

The living specimens were dredged by H.M.C.S. *Thetis,* off Port Kembla, 63-75 fathoms, and off Cape Three Points in 41-50 fathoms. Hedley afterwards recorded it from still further north, E. of Cape Byron, New South Wales, at 111 fathoms.

The occurrence of this living species in Balcombian (Oligocene) deposits in Victoria presents a curious and remarkable instance of a persistent form. It has remained true to itself from Balcombian to Recent times. As usual with the recent species occurring in the older Tertiary deposits, this form has retreated to lower latitudes in late years.

The small acutely rostrate form figured and described by Dr. Pritchard under the name of *"Leda" fontinalis* appears to be a local variant of this species, especially since it is commingled with it in the same fauna, and is less abundant. Pritchard has already referred to a MS. name of Tate's, *Leda embolos*, as "probably the species referred to . . . by Professor Tate." In the Dennant collection is a box containing *Nuculana* labelled *N. embolos*, from Fishing Point, Cape Otway, and presumably named by Professor Tate for Mr. Dennant. These belong, however, to Hedley's *N. miliacea.*

Examples of *Nuculana miliacea* Hedley sp. in the Dennant collection (probably the basis of the records of *N. fontinalis* of the Dennant and Kitson list) are from the following localities:—

Balcombian—

Muddy Creek (Older).

Janjukian—

Shelford, Birregurra, Torquay, Curlewis, Fishing Point (Calder River), Guerard's Hill, Wilkinson's No. 4 (between Eagle's Nest and Castle Cove, Cape Otway), Table Cape.

Kalimnan—

Beaumaris.

Distribution in Bore.—618 feet, in greenish sand-rock; 630 feet, greenish sand-rock with shells; 674 feet, grey shell-marl; 694 feet, greenish calcareous sand-rock; 730 feet, grey calcareous sand-rock; 1,295 feet, greenish grey marl with shells; 1,310 feet, grey sandy marl; 1,318 feet, pale grey marl with shells; 1,360 feet, grey marl with shells; 1,615 feet, pale green sandy marl with shells.

NUCULANA FORTIS Hedley sp. Plate IV., Fig. 19.

Leda fortis Hedley, 1907, p. 362, pl. LXVI., fig. 2, 3.

Observations.—This species is also a new record of a living form occurring in fossil strata. It was found by the late Chas. Hedley in material gathered by the "Woy Woy" from 800 fathoms, 35 miles east of Sydney, New South Wales.

Hedley's description runs as follows:—"Shell small, solid, smooth, nearly equilateral, subtriangular, rather inflated. Colour cream. Sculpture, delicate growth lines. Rostrum short and broad, with an

angular ridge. Dorsal margins meeting at an acute angle. Anterior and ventral margins rounded. Hinge with twelve teeth on each side. Height, 3.7; length, 4.2; depth of single valve, 1.45 mm."

The fossil specimen, which is associated with a Janjukian fauna in the bore, agrees in every particular with Hedley's description and figure, with the exception of the less conspicuous angulation of the rostral surface. From *N. fontinalis* it differs in the almost equilateral shell, there being no caudation of the posterior extremity, and the cardinal line slopes away from the beaks on either side uniformly. The length of the fossil specimen is 2.5 mm.

Distribution in Bore.—1,107 feet, grey sandy marl.

Genus **PROPELEDA** Iredale.

(Note.—This genus is distinguished from *Poroleda* by the arcuate rather than alternate teeth and by the presence of a rostral angulation on the shoulder of the valve).

Propeleda ensicula Angas sp., Plate V., Fig. 24.

Leda ensicula Angas, 1877, p. 177, pl. XXVI., fig. 27. Smith, E. A., 1885, p. 239. Hedley, 1902, p. 293, fig. 41.

Observations.—Hedley's figure of a recent *"Leda" ensicula* given in above references (1902) from Port Kembla, 63-75 fathoms, exactly agrees with the Sorrento specimens from 605 feet. The associated fauna in the bore indicates a Kalimnan horizon.

In his "Check List of the Marine Fauna of New South Wales," Hedley (1918, p. M4) links Beddome's *"Leda" lefroyi* with the above species. It is worth noting, however, that the fossil specimen here recorded and figured is identical with Hedley's figure of *N. ensicula* given in 1902, both in the character of the cardinal border and the contour of the shell.

Distribution in Bore.—605 feet, in grey, calcareous sand-rock with shells.

Genus **SAREPTA** A. Adams.

Sarepta planiuscula Tate sp. Plate V., Fig. 23.

Leda planiuscula Tate, 1886, p. 130, pl. V., fig. 2.
Sarepta planiuscula Tate sp., Chapman and Singleton, 1927, p. 116, pl. X., Figs. 8-12.

Observations.—A single valve of this genus occurs in the Sorrento Bore. It is minute and with an almost circular outline. It agrees with *S. planiuscula*, a shell from the Adelaide Bore, rather than with the transversely lengthened *Sarepta obolella*, so common in Victoria.

Distribution in Bore.—1,107 feet, grey sandy marl.

Fam. Limopsidae.

Genus **LIMOPSIS** Sasso.

Limopsis affinitalis sp. nov. Plate III., Fig. 14.

Description of Holotype (719 feet).—Ephebic form. Left valve subcircular in outline; almost equilateral, incrassate. Umbo slightly anterior. Surface strongly convex. Ornament consisting of a well-

marked series of concentric and radial lines of equal strength; slightly coalescent at the points of junction. The interspaces of the reticulate ornament quadrate.

Interior of valve with slightly projecting umbo, rather strongly curved; cardinal line with about eight curved to uncinate teeth on either side and a central resilifer. Margin of valve, flattened and perfectly smooth.

Dimensions of Holotype.—Length, 9 mm.; height, 8.75 mm. Thickness of valve, 2.5 mm.

Description of Paratype (741 feet).—Gerontic form. Shell, right valve, incrassate, oblique, obovate, umbo subanterior. Margin of shell evenly rounded in front, angulately truncate behind. Valve deep and strongly convex, especially towards the later growth stages; the lines of accretion becoming more irregular after the ephebic stage. Ornament similar to that of holotype. Internally the cardinal area shows the same curved series of teeth but with age have considerably increased in length, and there is a well-marked ligamental area above the cardinal line and a conspicuous resilifer.

Dimensions of Paratype.—Length, 14 mm.; height, 14 mm. Thickness of valve, 6 mm.

Observations.—From *L. maccoyi* this species differs in having the radial and concentric ornament equally strong whilst the shell itself is more highly convex and of thicker structure. From *L. insolita,* as typified at Torquay, this species differs in the well-marked ornamentation of the valve, which in the former is shown as a faint contusion between feeble series of radial and concentric markings. In the obliquity of the gerontic form, however, there is a decided resemblance to the Spring Creek species. From *L. beaumariensis* the present species differs in having a rounded to obovate form of shell rather than subtrigonal. *L. beaumariensis* is also much more depressed, although in ornament it somewhat approaches our species.

Distribution in Bore.—719 feet, grey incoherent sand-rock; 741 feet, grey calcareous sand-rock.

Fam. Arcidae.

Genus LISSARCA E. A. Smith.

Lissarca cinctura ta, sp. nov. Plate III., Fig. 15.

Description of Holotype.—Valves ovate, very oblique, tumid. Beak more anterior than in *Limopsis.* The ventral border is truncate anteriorly and evenly rounded towards the posterior. Surface of shell strongly concentrically ribbed, with a faint trace of radial sculpture. Interior of shell with ventral edge flattened. Ligament pit practically obsolete; cardinal denticule small, followed by numerous marginal fossae.

Dimensions.—Length of shell (Holotype), left valve, 3.25 mm.; height, 2.25 mm.

Observations.—This species resembles *Limopsis morningtonensis* in its sculpture, but is a more oblique shell, whilst the cardinal area shows it to belong to the genus *Lissarca.*

Distribution in Bore.—1,107 feet, grey sandy marl. Several examples.

Genus ARCA Lamarck.

Subgenus BARBATIA Gray.

ARCA (BARBATIA) MICROÜNDULA sp. nov. Plate III., Figs. 12*a, b*.

Description of Holotype.—Right valve. Valves similar, small; inflated; elongate oblong, tapering slightly anteriorly. Ventral margin sinuate. Ornament of numerous rounded beaded ribs, about 38 in holotype. Where the concentric growth-lines cross the riblets there results a beaded ornament over the median area that passes into tegulation as the costae approach the extremities of the shell. The neanic stage of the shell has the costae less conspicuously beaded. Inner margin of valve flattened posteriorly, crenulated ventrally. Cardinal line narrow, with 4 divaricate cartilage furrows on each side of umbo, and minute central teeth.

Dimensions.—Length, 3.5 mm.; height, 2.75 mm.

Observations.—The present species reminds one of the left valve in *Arca (B.) dissimilis* Tate, in which species, however, the right valve is nearly smooth. The radial costae in *A. (B.) dissimilis,* however, are not so well defined as in *A. (B.) microïndula.* The new species differs from *A. (B.) pumila* Tate in the character of the cardinal line, which in the latter consists of a continuous series of gradually increasing teeth; and in the non-sinuate ventral border.

Distribution in Bore.—618 feet, calcareous sand-rock; 623 feet, grey calcareous sand-rock; 660 feet, greenish calcareous sand-rock.

ARCA (BARBATIA) DISSIMULINA, sp. nov. Plate III., Figs. 13*a, b*.

Description of Holotype (670 feet).—Left valve. Shell subovate, narrowing towards the anterior. Roundly convex on the posterior extremity; surface well inflated with a median depression from the umbo to the ventral. Ventral border nearly straight but medially sinuate. Hinge line straight with a prominent umbo. Ornament consisting of numerous radial riblets; the interspaces less than the diameter of the ribs, crossed by moderately fine concentric lines of growth. At the intersection of these radial and concentric lines the ornament tends to become beaded.

Interior of valve with the ventral border flattened and conspicuously denticulate. Cardinal line with lateral ligamental teeth and depressions, and a short series of vertical teeth confined to the central area.

Dimensions.—Length, 6.5 mm.; height, 4.5 mm. Thickness of valve, 1.5 mm.

Observations.—At first sight this species might appear to be related to *Arca dissimilis,* but besides belonging to a different subgenus from that species, it is oblique rather than sub-rectangular in outline. It has a median sub-umbonal depression and a denticulation of the interior of the ventral edge, both of which characters are wanting in *Arca dissimilis.* From the other new species described here, *Arca (Barbatia) microïndula,* the present species differs in the absence of a distinct sinus on the ventral border and in the presence of the strong denticulate ventral ornament of the interior.

Distribution in Bore.—670 feet, greenish sand-rock with small shells; 674 feet, grey shell marl with thick bands of mollusca.

Fam. Periidae.

Genus **PHILOBRYA** Carpenter.

Philobrya bernardi Tate. Plate IV., Fig. 16.

Philobrya bernardi Tate, 1898, p. 88, pl. IV., fig. 10. Idem, 1899, p. 277.

Observations.—One typical right valve was found in the present washings. Its range extends from the Muddy Creek (Lower) beds and Balcombe Bay to the Fyansford, Shelford, Curlewis, and Mitchell River deposits.

In the present specimen the fenestration of the surface is not so strongly marked as in Tate's figured specimen, but the species is undoubtedly variable in this respect as seen in specimens in the Dennant collection.

Distribution in Bore.—1,107 feet, grey sandy marl.

Fam. Anomiidae.

Genus **ANOMIA** Müller.

Anomia tatei. Chapm. & Singl., sp. nov. Plate XI., Figs. 76*a, b*.

Description of Holotype.—Left (lower) valve of a somewhat eroded gerontic specimen, large, translucent, with nacreous to horny lustre. Ventral margin gently but somewhat irregularly rounded, evenly joining anterior margin and making an angle of about 130° with posterior margin. Dorsal margin roundly angulate at about 150°; umbo depressed, inconspicuous. Shell higher than long in present condition, owing to imperfection of anterior and posterior margins; restored outline on evidence of growth lines, sub-circular to subovate and probably longer than high. Surface gently but somewhat unevenly convex, showing irregular growth stages, giving a concentric undulose aspect, especially in the later part of the shell. Depressed radial threads, narrower than the interspaces, constitute an ornament crossing the concentric lines and more in evidence in the neanic stage than towards the ventral margin, which region in the present shell is somewhat abraded.

Interior of valve pearly, excepting the muscle scars, which have a roughened appearance, with their margins salient or otherwise well defined. Cardinal margin somewhat flattened, edentulous, but with a thickened process anteriorly which is directed towards the cavity of the shell. Chondrophore in umbonal cavity elongate and anteriorly, with concentric growth lines and with calcified remains of insertion of resilium. Beneath the anterior end of the chondrophore is the small irregularly ovate scar of the upper byssal muscle. A large subcentral area contains a group of three muscle scars, consisting of the principal sub-circular or paraboloid byssal scar with the rounded end towards the umbo, and immediately beneath it two smaller sub-circular muscle scars, of which the anterior or lower byssal scar is larger than the adductor scar, with which it makes a straight junction.

Dimensions.—Probable length of shell when complete, 60 mm.; height of shell, 50 mm.; depth of valve, 10 mm. Dimensions of muscular impressions.—Height, 26 mm.; width, 18 mm.

Locality of Holotype.—From the Kalimnan of Grange Burn near Hamilton, Victoria, presented by Mr. F. A. Singleton, M.Sc.

Note on the Specimens from the Bore.—At 605 feet there are eight examples of this species represented by left valves up to the neanic stage. These vary greatly in convexity, some of them being almost flat whilst others are strongly convex and almost crispate. At 670 feet there is one left valve in the neanic stage which is of moderate convexity and of marked thinness. At 694 feet there is a single left valve, having a length of 18 mm.; in this the umbo is more than usually prominent owing to strong convexity in the early stage. At 1295 feet there are two embryonic shells (left valves) which are probably referable to this genus. At 1615 feet there is a single valve with the same juvenile characters.

Fam. Mytilidae.

Genus MODIOLUS Lamarck.

Modiolus lineus Hedley sp. Plate IV., Fig. 17.

Modiola linea Hedley, 1906, p. 300, pl. LVI., fig. 23-5.

Observations.—It is interesting to note the occurrence of the above species in the fossil condition for the first time. Hedley's living specimens were obtained off Narrabeen, New South Wales, in 80 fathoms. The figured specimen given by Hedley agrees with our fossil with the minor exception of greater elongation of the valve in the latter, which can only be regarded as subvarietal. The description of this species as given by Hedley runs as follows:—"Shell small, thin sub-cylindrical, smooth and glossy, anteriorly slightly produced and angled, posteriorly rounded, dorsal and ventral margins parallel. Umbo low, a little incurved, at a fifth of the total length. Colour white, with a few small, scattered, brown dashes. Sculpture regular, concentric growth striae, which posteriorly are traversed by a few faint impressed rays. Periostracum thin, polished. Hinge edentulous. Length, 5.75; height, 2.5; depth of single valve, 0.9 mm."

Dimensions.—Length, 3.5 mm.; height, 1.35 mm.

Distribution in Bore.—741 feet, grey calcareous sand-rock.

Fam. Myochamidae.

Genus MYODORA Gray.

Myodora gabrieli, sp. nov. Plate IV., Figs. 18*a-d*.

Description of Holotype.—Shell very inaequilateral, elongate oblong, umbo sharp; anterior margin of valve truncately rounded from beak to ventral; ventral widely rounded; vertically truncated posteriorly. Right valve moderately inflated; left valve flat. Surface of both valves ornamented with widely spaced, fine, rounded, concentric ribs, the interspaces being smooth and flat.

Dimensions.—Right and left valves. Length, 9 mm.; height, 7 mm.

Observations.—This species appears to be identical with examples from Beaumaris (labelled "Cheltenham") in the Dennant collection. It may therefore be regarded as a definite Kalimnan species. Its nearest related form is the living *M. pandoraeformis* Stutchbury, found in Victoria and New South Wales, from which it differs in its straighter or less-upturned posterior and less rounded beaks. *M. gabrieli* is, on the other hand, related to the older, Janjukian species, *M. tenuilirata* Tate, in its general shape, but the concentric ornament is more widely faced and the right valve is less swollen.

Another species of *Myodora*, closely related, but not conspecific, has lately been described by Iredale (1924, p. 201, pl. XXXIII., fig. 9-10) as *M. royana*. This was dredged off Green Cape, New South Wales, in 50-70 fathoms. Iredale regards it as a deep-water relative of *M. pandoraeformis* Stutchbury sp., from which it differs in "shape and finer structure." It differs also from *M. gabrieli* in shape, having a longer anterior and coarser concentric sculpture.

Distribution in Bore.—694 feet, greenish calcareous sand-rock with shells; 719 feet, grey incoherent sand-rock; 730 feet, grey calcareous sand-rock; 741 feet, grey calcareous sand-rock.

Fam. Cuspidariidae.

Genus CUSPIDARIA Nardo.

Cuspidaria vellicata, sp. nov. Plate V., Fig. 20.

Description of Holotype.—Shell, minute. Valve (right), roundly ovate, swollen, anterior side steeply sloping and rounded, posterior rostrate. The ventral margin is well rounded anteriorly, strongly incurved and becoming straight on the rostral edge. An umbonal ridge indicated by a sharp oblique crest extending from the umbo to near the ventral margin. Ornament consisting of closely set but well defined striae.

Dimensions.—Length, 3 mm.; height, .2 mm.

Observations.—The nearest related species are recent forms, amongst which the closest is *C. brazieri* Smith sp. (1885, p. 91, pl. IX., fig. 3). In this form, which is found in New South Wales, the rostrum is shorter and the concentric sculpture is finer and more indefinite. It also bears some resemblance in outline to *C. capensis* Smith sp. (1885, p. 45, pl. IX., fig. 5) from the Cape of Good Hope, but there again the sculpture is almost evanescent.

Distribution in Bore.—605 feet, a fine-grained, calcareous sand-rock with shells.

Fam. Carditidae.

Genus CARDITA Bruguière.

Cardita sorrentae sp. nov. Plate XI., Figs. 77, 78.

Description of Holotype.—Shell of medium size, ovately oblong; depressed. Beaks anterior, with the front margin sloping down to meet the ventral border in a sub-acute angle. Ventral margin broad and widely curving to meet the posterior in a rounded angle. Holotype with 15 prominent beaded ribs, radiating from the umbo and only slightly curved. The ribs rapidly become nodose towards the ventral margin and scaly and even spinose on the posterior margin. Interior of valve showing an ovate or sub-lunate anterior adductor impression and a sub-quadrate posterior impression. Ventral margin crenulate and almost spinose. Cardinal area narrow with dentition typical of *Cardita* having a very slender 4*b* and an acutely triangular 2 in the holotype (left valve). The paratype (right valve) has a large platy cardinal and narrow sockets for 2*a* and 2*b* of the left valve.

Observations.—From the living *Cardita calyculata* Linn. sp. our fossil species differs in being decidedly more depressed, with less pronounced umbonal ridge, more evenly convex ventral margin and greater number of ribs.

Dimensions.—Holotype (left valve). Length, 10 mm.; height, 7.5 mm. Thickness of valve, 3 mm. Paratype (right valve). Length, 6.5 mm.; height, 5 mm. Thickness of valve, 1.5 mm.

Distribution in Bore.—Holotype, 623 feet, grey calcareous sand-rock with rich shell layers. Paratype, 719 feet, grey incoherent sand-rock.

Genus VENERICARDIA Lamarck.

VENERICARDIA ARCHAENEPEANENSIS, sp. nov. Plate XI., Fig. 79.

Description of Holotype.—Shell ovate, depressed, with a rather prominent, sub-acute beak. The umbo is situated a little to the anterior side. Anterior margin curving away from the beak; the posterior with a gently convex slope towards the post-ventral angle. Ventral border broadly convex. The ornament consists of radiately curving series of 16 costae. These ribs are beaded in the younger stages of the shell, becoming tegulate in the ephebic. Interspaces between ribs as wide or slightly wider than the ribs and the surface relieved with faint undulae. Adjacent to the ribs on either side of each are faint, raised sub-costal ridges, especially in the median region of the valve. Valve margins crenulate. Interior of valve having the ventral margin channelled close to the edge and over each external riblet. Cardinal area comparatively narrow. In the dentition the left valve (holotype) has 4*b* lengthened and 2 sharply triangular, thus approaching *Cardita* (olim *Mytilicardia*) in this and other respects; in fact the species seems to be an annectant form between these two genera.

Dimensions.—Length (left valve), 15 mm.; height, 13 mm.

Observations.—The only *Venericardia* in our Victorian Tertiaries with which we can make comparisons is *V. peclen* Tate sp. (Tate, 1886, p. 151, pl. II., fig. 11) but that species has 22 ribs and the shell is depressed in general form. It is however closely related to that form, which is of Kalimnan age, and apparently coeval with the present species. A living form which approaches our species is *V. bimaculata* Deshayes sp., but that form also has a depressed shell.

Distribution in Bore.—674 feet, grey shell marl, with thick bands of mollusca.

VENERICARDIA SUBCOMPACTA, sp. nov. Plate V., Fig. 21 and Plate XI., Fig. 80.

Description.—Shell small, sub-circular. Beak not prominent. Surface of valve with 25 ribs (in holotype) closely compacted, with only linear spaces between. Costae concentrically incised, imparting a beaded appearance, with transversely ovate segments to the beads. The umbonal region shows a concentric ornament predominating over the radially costate, as in *Venericardia calva* Tate sp. but not so distinct.

A paratype, in the Dennant collection named in MS. as above, from the Gippsland Lakes (Jemmy's Pt.) shows a larger development of the same species of shell, with only 18 costae. It bears a similar concentric ornament at the umbonal region, and the outline is also sub-circular.

Dimensions of Holotype.—Length, 2.5 mm.; height, 3.2 mm.

Dimensions of Paratype.—Length, 6 mm.; height, 6.5 mm.

Observations.—This species is a Janjukian to Kalimnan development of the previously described *V. compacta* of Tate, which has typically 24 ribs, as recorded by that author.

Distribution in Bore.—605 feet, grey calcareous sand-rock; 618 feet, calcareous sand-rock with *Turritella;* 661 feet, calcareous sand-rock with *Turritella;* 694 feet, greenish calcareous sand-rock with *Turritella;* 730 feet, grey calcareous sand-rock with *Limopsis;* 741 feet, grey calcareous sand-rock with foraminifera.

Fam. LEPTONIDAE.

Genus NEOLEPTON Monterosato.

NEOLEPTON NOVACAMBRICUM Hedley. Plate V., Figs. 22*a, b.*

Neolepton novacambrica Hedley 1915, p. 701, pl. LXXIX., fig. 29-32.

Description of living form.—"Shell small, thin, rounded, rather longer than high, glossy and smooth. Colour white. Faint concentric sculpture. Umbo tumid, prominent. In the left valve a small posterior and a central arched cardinal with a long thickened anterior limb. In the right, a prominent bifid anterior, and a smaller, simple, posterior cardinal. Height, 2.0; length, 2.2; depth of single valve, 0.6 mm."

Observations on the fossil specimens.—The above details are matched in the fossil specimen as to approximate size, shape and hinge characters. The concentric sculpture may however be a little more marked, but in some fossil examples are nearly smooth. It is impossible to separate the fossil from the living examples.

It is of much interest to note the above species as a fossil for the first time. It is somewhat puzzling to meet with it at one horizon only, where it is numerous, but more careful search in our fossil deposits may reveal it elsewhere.

Distribution in Bore.—1,160 feet, greenish-grey sandrock with polyzoa and mollusca.

Fam. CARDIIDAE.

Genus PROTOCARDIA Beyrich.

PROTOCARDIA ORNITHOPETRONICA, sp. nov. Plate XII., Fig. 81.

Description of Holotype.—Shell small. Valves deeply inflated, roundly trigonal. Umbones prominent, large, incurved to the cardinal area. Outline as seen from the interior, cardinal line short, nearly straight, anterior margin evenly rounded and curving continuously with ventral border; posterior margin nearly vertical to the cardinal line and meeting the ventral edge in a sub-acute angle. Inner ventral edge finely denticulate. External surface of valve relieved with fine radial striae and crossed at wide intervals by lines and sulci of growth. The posterior third of shell has the radii finely spinulose, producing the discrepant ornament common to the generic form. Interior of valve marked by very delicate radial striae. Colour bands of alternating buff and plum brown are seen in well-preserved specimens.

Dimensions of Holotype (Ex. Dennant collection in National Museum from Bird Rock, Torquay). Length, 13.5 mm.; height, 10 mm. Depth of valve, 6 mm. Named in MS. by J. Dennant.

Dimensions of Sorrento specimen.—Paratype (imperfect). Length, circ., 4.25 mm.; height, circ., .4 mm.

Observations.—The above species may in a general way be compared with *Protocardia pulchella* Gray sp. found living off Victoria and New South Wales, but which differs from *P. ornithopetronica* in having a more circular (less quadrate) outline, whilst the posterior granulations are not so asperrimous. In the *Protocardia hemimeris* Tate sp. (Tate 1887, p. 153, pl. XIV., fig. 2*a-c*) the valve is smoother and more finely costate in the median area and the denticulae of the ventral edge finer than in *P. ornithopetronica*.

Distribution in Bore.—(Paratype), 1,070 feet, grey sandy marl.

Fam. Veneridae.

Genus **ANTIGONA** Schumacher.

Antigona dennanti, sp. nov. Plate VI., Figs. 26*a, b*. Plate XII., Fig. 82.

Description of Holotype.—Holotype (Dennant Collection). Shell of medium to small size; ovately oblong; longer than high. Beaks moderately prominent and acute, situated in front of the middle axis of shell; anterior border beneath beaks concave and roundly curving to the ventral border, which is widely convex; the posterior margin roundly curving to ventral margin and in the lower third almost vertical with the ventral. Surface not much inflated with a series of sharp ridge-like growth-lines, more pronounced in senile form, and crossed by fine radial thread-like costae. Interior of valve finely crenulate.

Dimensions of Holotype (Jemmy's Point, Gippsland).—Length, 25 mm.; height, 19 mm. Thickness of united valves, 12 mm.

Dimensions of Paratype (Sorrento Bore, 660 feet).—Length, 4 mm.; height, 3.25 mm.

Observations.—This neatly ornate species belongs to the *Antigona striatissima* group. It differs from that form in its more quadrate outline. The specimens from Jemmy's Point, in the Dennant collection, were tentatively named "*Chione lineolata.*" Since that trivial MS. name runs a probable risk of preoccupation, we here append the name of its first collector. The type is a fairly large and senile example, about five times the length of the shells usually met with in the bores, although at one depth, 623 feet, there are valves attaining a length of 12 mm. The ornament of *Antigona dennanti* cannot easily be confused with that of *Katelysia propinqua,* another Kalimnan species, for the concentric growth-lines of the former are sharper and more widely spaced, and the lineation more pronounced.

There are also examples of the above species in the Dennant collection from Beaumaris, another Kalimnan locality.

Distribution in Bore.—618 feet, calcareous sand-rock of greenish tin; 623 feet, grey calcareous sand-rock with rich shell layers; 660 feet, greenish calcareous sand-rock with shells; 674 feet, grey shell-marl with mollusca; 694 feet, greenish calcareous sand-rock with shells.

Genus KATELYSIA Römer, 1857.

KATELYSIA MULTISTRIGOSA sp. nov. Plate V., Fig. 25.

Description of Holotype.—Shell minute, subovate, beaks acuminate sloping to the ventral margin, sharply rounded anteriorly and broadly at the posterior extremity. Shell rather depressed, ornamented with numerous fine concentric riblets, which occasionally coalesce as in *K. strigosa* Lam.; concentrics number about 10 in 1 mm. Concentric striae crossed with very fine radial threads. Inner ventral margin flattened, smooth.

Dimensions of Holotype (from 605 feet).—Length, 3.25 mm.; height, 2.75 mm.

Observations.—This species, although resembling *K. strigosa,* also met with in the upper part of the bore, is easily separable by its more depressed shell, acute beaks, sharper anterior border and more numerous concentric ribs, 10 as against 5 in young examples of *K. strigosa.*

Distribution in Bore.—605 feet, grey calcareous sand-rock with shells; 730 feet, grey calcareous sand-rock with *Limopsis.*

Genus CLAUSINELLA Gray.

CLAUSINELLA SHELFORDENSIS sp. nov. Plate VI., Fig. 27.

Description of Holotype.—(Dennant collection from Shelford.) Shell small, quadrately ovate. Beaks prominent, well forward; anterior border in front of beaks short, vertical; posterior margin long, sloping gently from beaks and meeting the ventral border in an obtuse angle. Shell not much inflated; surface relieved by widely spaced, thin, salient ridges, the interspaces finely concentrically striate. Cardinal area moderately strong. Ventral inner margin thin, slightly flattened and obscurely dentated.

Dimensions of Holotype.—Length, 7.5 mm.; height, 7.25 mm. Thickness of valve, 2.5 mm.

Paratype from Bore.—Length, 2 mm.

Observations.—This species is an interesting annectant form between the sub-quadrate *Bassina allporti* T. Woods sp. and *C. subroborata* Tate sp. The former is narrower anteriorly than the new species, whilst the latter is distinctly subtrigonal in outline.

Distribution in Bore.—1,615 feet (two examples), pale green sandy marl with shells.

Class SCAPHOPODA.

Fam. DENTALIIDAE.

Genus DENTALIUM Linné.

DENTALIUM SEMIARATUM sp. nov. Plate III., Fig. 28.

Description of Holotype (719 feet).—Shell minute, very slightly curved. Nine sharp riblets in the anterior half of shell which rapidly die out posteriorly, where the surface of the shell is smooth and cylindrical. There is a fine but distinct concentrically striate ornament, practically confined to the costate part of the shell.

Dimensions.—Length, 3.75 mm. Diameter of anterior extremity, .6 mm.

Observations.—This species bears some resemblance to *D. aratum* Tate (Tate 1887, p. 192, pl. XX, fig. 8) in having an angulated shell

with a sparse costation, but differs in the absence of that ornament on the posterior half; it is also of very much smaller dimensions and with a nearly straight shell. A second specimen accompanied the selected holotype which shows precisely the same characters excepting for having one or two additional riblets.

Distribution in Bore.—719 feet, grey, incoherent sand-rock.

Class GASTEROPODA.

Order ASPIDOBRANCHIA.

Fam. Liotiidae.

Genus LIOTELLA Iredale, 1915.

Liotella capitata Hedley sp. Plate VI., Fig. 29.

Liotia capitata Hedley, 1907, p. 357, pl. LXVII., fig. 13, 14.

Description of Living Example (Hedley 1907, p. 357).—Shell minute, subdiscoidal; spire slightly elevate, umbilicus wide. Colour cream. Whorls three. Protoconch of a whorl and a half, tilted and inflated. Last whorl scarcely in contact with its predecessor, at last deeply descending. Sculpture, sharp projecting ring ribs, widely spaced on the last half whorl, but crowded on the penultimate, the interspaces and protoconch smooth. Aperture oval, oblique, entire, downwardly directed, fortified by a prominent ring varix. Height, 0.6; major diameter, 1.3; minor diameter, 0.9 mm.

Observations.—The fossil specimen from the Sorrento Bore exactly matches the living example described as above, by Chas. Hedley, from 800 fathoms 35 miles east of Sydney. Hedley obtained only a single shell, and the present one is unique amongst the fossils in the Bore. Comparison may be also made with the living *Liotella annulata* T. Woods sp., which differs, however, in having an angulated whorl.

Dimensions of fossil specimen.—Height, 1 mm.; major diameter, 2 mm.; minor diameter, 1.5 mm.

Distribution in Bore.—741 feet, in grey calcareous sand-rock.

Fam. Trochidae Adams.

Genus NOTOGIBBULA Iredale.

Notogibbula sp.

Observations.—The example here referred to would apparently fall into the genus *Calliotrochus* as used by May. Fischer's original description of the genus refers to a smooth shell. Iredale (1924, p. 226) has suggested the new generic name *Notogibbula* for the type of specimen before us, and he takes *Gibbula coxi* Angas as the genotype. The present specimen is an immature example of a trochoid shape with three whorls and a smooth protoconch. The whorls are slightly convex and deeply sutured, giving a stepped appearance to the shell. The ornament consists of about five rounded lirae on the last whorl, and these are crossed by oblique closely set series of riblets. This in part gives the ornament a beaded appearance, but in certain lights shows a spirally costate arrangement. We await further specimens before venturing on a full diagnosis.

Dimensions.—Length, circumference, 2 mm.

Distribution in Bore.—1.470 feet, pale grey marl.

Fam. Umboniidae.

Genus TEINOSTOMA H. & A. Adams.

Teinostoma calva sp. nov. Plate VI., Figs. 31*a, b*.

Description of Holotype (1,180 feet).—Shell rather inflated, naticoid; spire depressed, consisting of rapidly increasing whorls, not quite flush with general surface; suture-line distinct. Base convex; lip thick, aperture circular, margin everted. Umbilical depression nearly or entirely filled with callus. Surface of shell marked with fine concentric growth-lines.

Dimensions.—Greatest diameter, 2.7 mm.; height, 1.7 mm.

Observations.—The above name is a MS. one by Dennant, with whose specimens we have compared the present examples. This species might at first sight be confused with *Teinostoma pulcherrima* Chapman & Gabriel (1914, p. 317, pl. XXVII., fig. 25*a-c*), but the present shell is more roundly convex and the base not so concave.

Dennant's records of his MS. *T. calva* include Muddy Creek (Lower), Mitchell River, Curlewis, Torquay, Cape Otway, Gellibraud, Shelford, Brown's Creek, Fishing Point.

Distribution in Bore.—661 feet, calcareous sand-rock with shells; 902 feet, grey sand-rock; 1,108 feet, grey sandy marl with *Dentalium;* 1,138 feet, hard grey marly sandstone with shells; 1,158 feet, grey sand-rock; 1,180 feet, grey marl; 1,191 feet, grey sand-rock; 1,240 feet, greenish grey sandy marl with shells; 1,286 feet, grey sandy marl; 1,320 feet, pale sandy marl with *Chlamys;* 1,410 feet, pale sandy marl with *Vaginella;* 1,461 feet, pale grey marl with few shells.

Genus CYCLOSTREMA Marryatt.

Cyclostrema cornuspira sp. nov. Plate VII., Figs. 32*a, b*.

Description of Holotype.—Shell minute; consisting of three smooth rounded whorls slowly increasing in diameter and a sub-spherical protoconch. Superior face depressed, showing all the turns. Inferior face depressed and concave at the umbilicus. Mouth circular. Shell surface showing above the polished surface under the microscope, minute growth lines.

Dimensions.—Great diameter, 1.4 mm.; shortest diameter, .9 mm.

Observations.—This species differs from the smooth living species from Tasmania and South Australia, *C. charopa* Tate (1899, p. 217, pl. VII., fig. 2*a-c*) in having less rapid increase in diameter of whorl and a rounder contour. It suggests at first sight, the foraminiferon, *Cornuspira*, hence the name.

Distribution in Bore.—1,150 feet, grey sand-rock with foraminifera and shells.

Genus BROOKULA Iredale.

Brookula singletoni sp. nov. Plate VI., Figs. 30*a, b*.

Description of Holotype.—Shell minute, turbinate, consisting of four inflated whorls and a smooth or faintly lirate round protoconch. Whorls ornamented with numerous sharp vertical riblets, about 40 on the

body whorl, where they are crossed by delicate transverse or spiral striae; this cancellation is only noticeable under magnification. Suture lines well impressed, aperture roundly oval, lip thin. Umbilicus as a small perforation.

Dimensions.—Height of shell, 1.15 mm.; width of shell, .92 mm.

Observations.—This is a typical *Brookula,* as defined by Iredale 1912, p. 219). The present species is much higher in the spire than *B. stibarochila* Iredale from the Kermadec group (Iredale 1912, p. 220, text fig.) and has more numerous riblets, as well as a faint cancellate ornament.

The little fossil species described by Finlay as *Brookula tenuilirata* (Finlay 1924, p. 528, pl. LIII., fig. 1*a-c*) from the Tertiary (Awamoan) of Pukeuri is perhaps the nearest to the present form, *Brookula singletoni,* for it possesses the same number of riblets and shows a faint cancellation, but differs in being more solidly built, with suture lines not so impressed.

Distribution in Bore.—1,461 feet, pale grey marl with few shells.

Fam. Eulimidae.

Genus EULIMA Risso.

Eulima bicurvata sp. nov. Plate VII., Fig. 33.

Description of Holotype.—Shell rather small, spire tapering rapidly, with a slight sigmoidal twist curving inwardly from the seventh or penultimate whorl above the aperture in the type, convexly on 3-5, and recurved again on the first and second whorl. Surface polished, sutures flush. Aperture long, ovate, inner lip thickened.

Dimensions.—Length, 3.75 mm.; diameter at base, 1.4 mm.

Observations.—This species is a MS. one of Dennant's. His localities are—Muddy Creek (Lower), Shelford, Cape Otway, Mitchell River, Curlewis.

E. bicurvata is easily distinguished from the other Tertiary forms by its more acute spire and from *E. acutispira* by its doubly curved apex.

Distribution in Bore.—One example (Holotype) from 990 feet, dark grey marl.

Fam. Pyramidellidae.

Genus TURBONILLA Risso.

Turbonilla mulderi sp. nov. Plate VII., Fig. 34.

Description of Holotype (from Corio Bay, Dennant collection).—Shell small, rather slender, turrited, consisting of 7 depressed whorls and a protoconch of about 2 turns. Sutures distinctly incised. Whorls ornamented with about 7 prominent straight ribs on each, with the interspaces slightly broader, sulcated and marked with fine spiral lines. The first 2 whorls rather angulate in the middle. Aperture subquadrate.

Dimensions.—Length, 3 mm.; width of last whorl, 1 mm.

Observations.—The above species appears to most nearly resemble *Turbonilla gabrieli* Hedley (1909, p. 449, pl. XLII., fig. 74), but that form has a slenderer shell, curved and thicker ribs, with less

interspace, and absence of spiral striae. Hedley's species was dredged from the Hope Islands, North Queensland. The type specimen of *T. mulderi* here described was found by J. F. Mulder at Western Beach, Geelong, and included in the Dennant collection in the National Museum under the same MS. name.

Distribution in Bore.—1,465 feet, pale grey marl.

TURBONILLA RADICANS sp. nov. Plate VII., Fig. 35.

Description of Holotype (670 feet).—Shell small, turreted. Heterostrophic protoconch smooth, consisting of two turns. Whorls flattened, sutures distinct. Costae thick, 12-14 in whorl; interspaces narrow; transversely striated, the striae passing over the ribs. Apertures quadrate. Base of body whorl, subangulate. Six costate whorls in type.

Dimensions.—Length of type shell, 3.7 mm.; width at base, 1.16 mm.

Observations.—This species resembles the living *T. fusca* A. Adams in some points, but the number of ribs in *T. radicans* is less and the whorls are not so inflated. Another living species which may be compared with the above is *T. gracillima* T.W., but which also differs in its more convex whorls and very prominent riblets.

T. liraecostata T. W., recorded from Table Cape, Birregurra, Corio Bay, Camperdown and Torquay, has, according to T. Wood's description, twice the number of costae as in *T. radicans.*

Distribution in Bore.—670 feet, greenish sand-rock; 741 feet, grey calcareous sand-rock; 1,170 feet, grey marl; 1,232 feet, grey sandy marl; 1,286 feet, grey sandy marl; 1,615 feet, pale green sandy marl with shells.

TURBONILLA CONSTRICTA sp. nov. Plate VII., Fig. 36.

Description of Holotype.—Shell small, slender, of delicate build; 7 spiral whorls rather more oblique than usual, convex, with sutures deeply incised. Protoconch small, heterostrophic. Surface ornament of fine, strongly curved riblets (about 24) on body whorl. Aperture long ovate; inner lip sharp and plate-like, outer lip strongly everted, flattened and smooth.

Dimensions.—Length of shell, 2.4 mm.; width of body whorl, .7 mm.

Observations.—The above species bear a general resemblance both to *Turbonilla scalpidens* Watson sp. (see Hedley 1903, p. 362, text fig. 84) and to the next species under notice, *T. tenuissima* Hedley. *T. constricta* differs from *T. scalpidens,* however, in the higher whorls, and the more numerous riblets. From *T. tenuissima* it is separated by the finer costation and the shorter embryonic series of whorls.

Distribution in Bore.—976 feet (holotype), dark coloured marl with small gasteropoda; 1,461 feet, pale grey marl with few shells; 1,470 feet, pale grey marl.

TURBONILLA TENUISSIMA Hedley. Plate VII., Fig. 37.

Turbonilla tenuissima Hedley, 1909, p. 450, pl. XLII., fig. 78.

Description.—"Shell minute, acicular, thin, translucent imperforate. Whorls nine, and a small heterostrophic protoconch, rounded and contracted at the sutures. Sculpture; first three

whorls smooth, remainder crossed by about 30 fine sharp, radial, arcuate ribs, which gradually vanish on the base. Length, 2.3; breadth, 0.5 mm."

Observations.—The fossil specimens of *Turbonilla* which I have determined as above, from the Sorrento Bore, are practically of the same dimensions as those found by the late Mr. Chas. Hedley from Hope Islands, Queensland, in 5 to 10 fathoms. The recent species *Aclis pellucida,* from a dredging between Phillip and French Islands, Western Port, in about 6 fathoms, described by Gatliff and Gabriel (1911, p. 187, pl. XLVI., fig. 4) somewhat resembles the above form; its protoconch, however, is stated to be rounded. Those authors have remarked its general resemblance to *Turbonilla fusca*, but the generic comparison in this case would not be upheld by their description.

Distribution in Bore.—1,050 feet, grey marl; 1,200 feet, grey sand-rock; 1,340 feet, greenish sandy marl with shells; 1,693 feet, grey sandy marl.

Genus ODOSTOMIA Fleming.

ODOSTOMIA DEPLEXA Tate and May. Plate VII., Fig. 38.

Odontostomia deplexa Tate and May, 1900, p. 97. Id. 1901, p. 383, pl. XXV., fig. 45.

Odostomia deplexa Tate and May sp. May, 1921, p. 98 (No. 962). Id. 1923, pl. XLIV., fig. 17.

Observations.—The fossil specimens from the Bore are closely comparable with the type figured by Tate and May from Frederick Henry Bay, Tasmania. As a recent species it has also been recorded from Victoria by J. H. Gatliff and from South Australia by Prof. Tate. The whorls in this species are rounder than in *Pyramidella polita* Johnston, which also occur in the bore, and it does not show the basal flattening seen in the latter species.

Distribution in Bore.—1,549 feet, pale grey marl; 1,560 feet, pale grey marl.

Genus PYRAMIDELLA Lamarck.

PYRAMIDELLA JONESIANA Tate sp.

Odontostomia (Syrnola) jonesiana Tate, 1898, p. 70, p. 82 (fig.).

Pyramidella jonesiana Tate sp., 1900, Pritchard and Gatliff, p. 147. Chapman and Gabriel, 1914, p. 319.

Observations.—This species was first known as an Upper Tertiary fossil (Kalimnan and Werrikooian), from the Mallee Bores and from Tintinarra Bore, South Australia. It was later recognized as a living species round the Flinders coast and in Westernport.

The range of the present examples seems to extend to a somewhat greater depth in the Tertiaries.

Distribution in Bore.—670 feet, greenish sand-rock with small shells; 694 feet, greenish calcareous sand-rock with shells; 730 feet, grey calcareous sand-rock; 1,050 feet, grey marl; 1,200 feet, grey sand-rock; 1,410 feet, pale sandy marl with *Vaginella.*

PYRAMIDELLA POLITA Johnston.

Pyramidella polita Johnston, 1879, p. 34. May, 1918, p. 73, pl. XI., fig. 21.

Observations.—This species was not figured until 1918 when Mr. W. L. May did good service by figuring Johnston's types of Table Cape fossils in the Hobart Museum, for as May observes (*loc. supra cit.*) it has been difficult, and in some cases impossible, for workers to identify the species from the descriptions alone. *P. polita* is distinguished from *P. jonesiana*, a related fossil and recent species, in having a shorter and stouter shell and an angulated base.

Distribution in Bore.—630 feet, 938 feet, 1,232 feet, 1,320 feet, 1,330 feet, 1,461 feet, 1,465 feet, 1,580 feet, 1,658 feet, 1,680 feet.

Genus SYRNOLA Adams.

SYRNOLA TINCTA Angas.

Syrnola tincta Angas 1871, p. 15, pl. I., fig. 11.
S. michaeli T. Woods 1877, p. 150.
S. tincta Angas. Tate and May 1901, p. 382. May 1921, p. 98. Id., 1923, pl. XLIV., fig. 14.

Observations.—The fossil specimen agrees in all particulars with the living form found in Victorian waters, with the exception that the columellar plait is not so conspicuous in the fossil.

In the Dennant Collection this species is well represented, and bears the MS. name of *Odostomia victoriae.* The localities for this species in the Dennant Collection are Mornington, Muddy Creek (Older), Shelford, Spring Creek, and Mitchell River.

Distribution in Bore.—1,232 feet, grey sandy marl.

SYRNOLA aff. AURANTIACA Angas sp.

Styloptygma aurantiaca Angas 1867, p. 112, pl. XII., fig. 14. May 1921, p. 98. Id., 1923, pl. XLIV., fig. 9.

Observations.—The fossil specimen found in the Sorrento Bore is of slightly heavier build than the living form; it is perhaps not quite so acutely tapering as in recent specimens. The columellar plait is fairly well marked as compared with the living form, and the surface instead of being perfectly smooth is faintly longitudinally striate when viewed in a bright light. The dimensions of both fossil and recent forms are similar.

Distribution in Bore.—938 feet, dark coloured marl with small Gasteropods.

Genus EULIMELLA Fischer.

EULIMELLA NITIDULA, sp. nov. Plate VII., Fig. 39.

Description of Holotype (Dennant collection.[1])—Shell minute, polished, except for faint striae seen in oblique illumination; whorls seven, flattened, surmounted by a small smooth heterostrophic apex. Sutures of whorls distinct but not sulcated. Body whorl basally depressed towards the columella; aperture ovate, outer lip thin, inner slightly everted below the columellar basal depression; not toothed.

Dimensions.—Length of shell, 4.25 mm.; width at base, 1 mm.

[1] The specimen from Sorrento was, unfortunately, lost since the diagnosis was made.

Observations.—This species appears to come under the generic designation of Fischer's genus *Eulimella*. It may be compared with at least one recent species, *Syrnola aurantiaca* Angas, in general form, but is generically distinct on account of the absence of a columellar plait.

Holotype, from the Janjukian marls of the Mitchell River, near Bairnsdale (Dennant Collection).

Distribution in Bore.—1,318 feet, pale grey marl with shells.

Fam. MATHILDIDAE.

Genus MATHILDA Semper.

MATHILDA DECORATA Hedley. Plate VII., Fig. 40.

Mathilda decorata Hedley 1903, p. 352, fig. 75. May 1921, p. 98. Idem. 1923, pl. XLIV., fig. 8.

Observations.—It is of much interest to record this living species for the first time as a Tertiary fossil. Two specimens occur in the bore, at 1,025 feet and 1,170 feet. The lengths of these specimens are 3.5 mm. and 5 mm. respectively. In comparing the recent specimens from New South Wales the fossil forms are closely identical both in the ornament and the apical angle of the shell. On the other hand, the Tasmanian recent example, as figured by May, has the same spire rather more slender and the ornament perhaps not so pronounced. This similarity of the Sorrento fossil with the shells from New South Wales point to an interesting comparison between the present climate at lower latitudes with that of the Janjukian in the Sorrento Bore.

Distribution in Bore.—1,025 feet, grey sandy marl with shells and polyzoa; 1,170 feet, grey marl.

Fam. EPITONIIDAE.

Genus EPITONIUM Bolten.

EPITONIUM CREBRELAMELLATUM Tate sp. Plate VII., Fig. 41.

Scalaria crebrelamellata Tate, 1890, p. 234. Idem. 1892, pl. XII., fig. 8.

Observations.—The depressed whorls, flattened lirae and crowded lamellae serve to distinguish this species from the related *E. escharoides* Tate sp. which was also described from the same horizon at Muddy Creek (lower bed). The example found in the Sorrento Bore is a perfect specimen and quite typical.

Distribution in Bore.—1,158 feet, grey sand-rock.

Fam. NATICIDAE.

Genus NATICA Scopoli.

NATICA GATLIFFI, sp. nov. Plate VII., Fig. 42.

Description of Holotype.—Shell minute, globose, depressed, spire not exsert, whorls 4, increasing very rapidly; surface polished; sutures distinct; mouth roundly ovate; outer lip passing over body whorl; inner lip with a moderate callosity about half filling the umbilical depression.

Dimensions.—Greatest width, 2.4 mm.; height, 1.6 mm.

Observations.—Probably the nearest fossil species to the above is *Natica hamiltonensis* Tate. That species differs, however, in the more open umbilical area and the swollen whorls together with its more prominent apex.

The nearest related species seems to be the recent form described by Pritchard and Gatliff (1900, pl. XX., fig. 4) under the name of *N. shorehami.* It agrees with that species in the general contour of the shell and in the shape of the aperture, but differs distinctly in having no surface wrinklings on the sutural area between the apex and the body whorl and in having a partially open umbilicus.

Distribution in Bore.—1,107 feet, grey sandy marl with *Dentalium.*

Fam. Rissoidae.

Genus HAURAKIA Iredale.

Haurakia gabrieli, sp. nov. Plate VII., Fig. 43.

Description of Holotype.—Shell minute, consisting of four costate whorls, surmounted by three apical turns, having a spirally lirate ornament. The whorls are inflated with well-marked sutures. The spire is short, aperture roundly ovate. Ornament consisting of a series of acute vertical riblets, about ten on body whorl, crossed by a very fine lirate ornament; interspaces with riblets deeply sulcate. The riblets extend over the shoulder of the body whorl.

Dimensions.—Length, .86 mm.; greatest width, .5 mm.

Observations.—This species may be compared with the form *H. tateana* T. W. sp. (*Rissoa tateana* T. W., 1877, p. 115), but for the differences that *H. gabrieli* is a higher shell with more inflated whorls, the inter-costae areas are more deeply sulcated, and the ribs pass over the body whorl. The short description of *H. tateana* by Tenison Woods leaves much to the imagination, but we have made comparisons with an authenticated topotype in the Dennant Collection labelled "type," which, however, it can hardly be, since T. Woods described type is "decollated," whilst this is perfect.

A recent species affording comparison with *H. gabrieli* is the Victorian and Tasmanian *H. discrepans* Tate and May sp. (1900, p. 99. Id. 1901, p. 391, pl. XXVI., fig. 65), but that species has the body whorl quite devoid of costae.

Distribution in Bore.—1,446 feet, grey sandy marl.

Genus EPIGRUS Hedley.

Epigrus varicifer us T. Woods sp.

Rissoina varicifera T. Woods 1876, p. 101.

Estea varicifera T. Woods sp. May 1919, p. 73, pl. XI., fig. 19.

Observations.—In Tenison Woods' description of this shell he states that there is "generally a continuous line of swollen conspicuous varices on the columella side of the whole shell." The present specimens from Sorrento, where the species occurs in some frequency, show vertical striae of an irregular character when seen under a strong light, but there is no true variceal ornament. It is interesting to note that W. L. May (1918, p. 73), makes the following remark upon this point of structure and says, "I doubt if this species would ever have true varices." May

regards this species as a member of the genus *Estea,* but since it links up with the group of smooth-shelled forms like *Epigrus dissimilis* Watson, it is so placed here.

Epigrus varicifera is quite the most abundant rissoid in the Middle and Older Tertiaries of Victoria, having been recorded from Muddy Creek (older bed), Shelford and Table Cape (Dennant and Kitson 1903, p. 112). In the Dennant Collection there are also examples of this species from Western Beach, Geelong, and Beaumaris.

Distribution in Bore.—730 feet, grey calcareous sand-rock with *Limopsis;* 902 feet, grey sand-rock; 997 feet, grey marl with *Pinna;* 1,107 feet, grey sandy marl with *Dentalium*; 1,286 feet, grey sandy marl; 1,295 feet, greenish-grey marl with shells; 1,310 feet, grey sandy marl with *Vaginella* and *Dentalium.*

EPIGRUS CHRYSALIDUS Chapman and Gabriel sp.

Rissoa (Onoba) chrysalida Chapman and Gabriel, 1914, p. 322, pl. XXVIII., fig. 32, 33.

Observations.—In our original paper, referred to above, we linked this species generically with *"Onoba" bassiana,* a living form. Since then a further differentiation of characters has been established, and *Onoba bassiana* Hedley has been placed in the genus *Subonoba* Iredale, whilst the present species naturally falls into the same genus as the preceding, *E. varicifera* T. Woods sp.

The present examples are quite typical of the species, which seem to be invariably confined to Kalimnan strata.

Distribution in Bore.—585 feet, shell sand and grit; 623 feet, grey calcareous sand-rock; 674 feet, grey shell-marl with thick bands of molluscs.

Genus RISSOINA d'Orbigny.

RISSOINA LINTEA Hedley and May.

Rissoina lintea Hedley and May 1908, p. 117, pl. XXII., fig. 9. May 1923, p. 55, pl. XXV., fig. 10.

Observations.—This is a living species along the coast of south-eastern Australia. Off Tasmania it occurs from 25 to 100 fathoms. The fossil specimens agree with the living forms, and show the same depressed contour of the whorls with a finely striate surface, otherwise polished, and with the suture channeled. The fossil specimens in some cases show an additional character of a fine spiral sulcus below the suture.

Distribution in Bore.—694 feet, greenish calcareous sand-rock with shells; 1,170 feet, grey marl; 1,333 feet, pale sandy marl with shells; 1,470 feet, pale grey marl; 1,549 feet, pale grey marl with glauconite sand.

RISSOINA STEVENSIANA T Woods. Plate VIII., Fig. 44.

Rissoa stevensiana T. Woods 1877, p. 100.

Description.—"Shell minute, narrowly pyramidal, nucleus somewhat suddenly contracted of two smooth turbinate whorls, spire

slightly tumid in the middle; whorls 10, angular or subcarinate in the middle, coarsely costate, from 12-16 ribs on each whorl, and finely but indistinctly lirate, ribs rounded, not much elevated and continuous from suture to suture, the latter very deeply impressed so as to give the whorls a rounded swollen aspect; base almost flat, aperture pyriform entire, one-fifth length of shell; columella simple. Long. 3, Lat., 1 mil."

Observations.—The specimens of the above species found in the Sorrento Bore show the number of riblets to be not absolutely constant, for in the same sample there are specimens with the typical number of ribs and others with slightly less or more. Comparison has been made with a topotype of the species in the Dennant Collection with which our specimens agree. In the same collection there is also a very fine species closely allied which, although new, appears to link up with the living *Rissoina variegata* Angas. Both the type specimen and that in the Dennant Collection occur at one locality only, Table Cape, Tasmania. The present specimens show it to range into the Kalimnan series.

Distribution in Bore.—623 feet, grey calcareous sand-rock; 630 feet, greenish sand-rock with shells; 661 feet, calcareous sand-rock with *Turritella.*

Fam. Turritellidae.

Genus **TURRITELLA** Lamarck.

Turritella acinella, sp. nov. Plate VIII., Fig. 45.

Description of Holotype (from 1,310 feet).—Shell minute; spire acutely pointed; apical angle 6 deg.; apical whorls two, smooth, convex. The whorls of the shell are somewhat flattened but relieved with strong sharp spiral ribs of which the median is the most conspicuous, the anterior next in strength and the posterior the feeblest. Intercostal spaces wider than the ribs. The body whorl is slightly convex. Sutures well marked towards the anterior. Aperture almost circular. Base of body whorl depressed on the inner columellar face.

Dimensions.—Length, 4.5 mm.; width, 1.7 mm.; diameter of mouth, .76 mm.

Observations.—As regards the ornament the nearest related species to the above appears to be *T. tristira* Tate. In that form, however, the shell is much broader at the base, having an angle of 15 deg. as against *T. acinella* with 6 deg. There is no possibility of *T. acinella* representing the juvenile stage of *T. tristira* on account of the difference of the appearance of the young stage of that species which has a uniformly broad spire. Moreover the shells of *T. acinella* are always minute and vary very little in length from that of the holotype.

T. acinella is represented in the Dennant Collection by specimens from Balcombe Bay, Curlewis, West Beach, Corio Bay, and non-typical specimens from Belmont.

Distribution in Bore.—719 feet, 990 feet, 1,200 feet, 1,204 feet, 1,232 feet, 1,259 feet, 1,295 feet, 1,310 feet, 1,318 feet, 1,320 feet, 1,330 feet, 1,400 feet, 1,410 feet, 1,426 feet, 1,446 feet, 1,465 feet, 1,490 feet, 1,525 feet.

TURRITELLA MULTICINCTURALIS, sp. nov. Plate VIII., Fig. 46.

Description of Holotype (from 741 feet).—Shell of moderate size. Whorls depressed, ornamented with spiral riblets numbering about five with finer intermediate ones, interspaces consist of shallow sulci only. Apical angle, 15 deg. The apical whorls, two, convex. The whorls in the neanic stage show a median riblet only. With increase of age the ribs multiply rapidly until they reach the normal stage of ornamentation after the fourth. Aperture subquadrate.

Dimensions of Holotype.—Length, 7 mm.; width, 2.25 mm; vertical diameter of mouth, 1.3 mm.; transverse diameter, 1.1 mm.

Observations.—There appears to be no living species in Victorian waters which are comparable with the above form. In the depressed habit of the whorls comparison may be made with *T. acricula* Tate, but there is no numerously striate ornament as in the present species. In the Dennant Collection there is a new species of *Turritella* from Rose Hill, near Bairnsdale, which resembles the present species in style of ornament, but the form of the shell is somewhat different being broader and altogether of heavier build.

Distribution in Bore.—623 feet, grey calcareous sand-rock with shell-layers; 741 feet, grey calcareous sand-rock with foraminifera and small shells.

TURRITELLA MEDIOPLICATILIS, sp. nov. Plate VIII., Fig. 47.

Description of Holotype (from 1,461 feet).—Shell minute; spire acute, consisting of seven whorls and two apical turns which are roundly convex. Apical angle, 6 deg. The whorls are flattened and relieved by a prominent median spiral band between which is a fainter band. The costation is not acute but rounded. Aperture subquadrate.

Dimensions.—Length, 3.25 mm.; width at base, 1 mm.

Observations.—The nearest form to the present appears to be *T. platyspira* T. Woods, but in that species the whorls in the apical portion are convexly rounded rather than depressed, and there is usually more than one rib of equal strength.

Distribution in Bore.—1,461 feet, pale grey marl with few shells.

Fam. CERITHIIDAE.

Genus CERITHIELLA Verrill.

CERITHIELLA TRIGEMMATA, sp. nov. Plate VIII., Fig. 48.

Description of Holotype (Dennant Collection, Mitchell River).—Shell, minute, having a slender spire with flattened to slightly concave whorls, which towards the apex are more or less convex. The apical series consists of three smooth, convex turns. Whorls of the spire ornamented with about ten prominent costae crossed by three spiral bands on each whorl, which causes the clathration to be broken up into bead-like prominences. The spiral bands are more pronounced towards the anterior part of the shell. Aperture quadrate with a short columellar canal. Base of shell flat.

Dimensions.—Length, 5.75 mm.; width at base, 1 mm.

Observations.—This species appears to be well distributed in the Victorian Tertiaries, and is the commonest of the genus in the Sorrento

Bore. Although it is here described for the first time, it had already been named by Mr. J. Dennant, who gave it the MS. name "*trigemmata.*" It is from his specimens that we have selected the holotype on account of the more or less fragmentary condition of those from the bore.

This species in some respects approaches *Cerithium salteriana* T. Woods (1879, p. 5, pl. I., fig. 11). It differs from that species however in having an extended apical series, and the granulations of the ribs are not numerous. The only other locality for this new species appears to be the Mitchell River beds near Bairnsdale (Janjukian).

Distribution in Bore.—995 feet, grey marl with shells; 1,107 feet, grey sandy marl with *Dentalium;* 1,310 feet, grey sandy marl with Polyzoa and *Vaginella;* 1,465 feet, pale grey marl.

Genus BITTIUM Gray.

BITTIUM TURRITELLIFORME Angas sp. Plate VIII., Fig. 49.

Bittium turritelliformis Angas, 1877, p. 174, pl. XXVI., fig. 14.
Seila attenuata Hedley, 1900, p. 91, pl. III., fig. 9.
S. turritelliformis Iredale, 1924, p. 246. Idem. May, 1921, p. 59. Idem. May, 1923, pl. XXVII., fig. 12.

Observations.—It is apparent from the description of the recent shells that there is a good deal of variation in the convexity of the whorls. Curiously, only dead specimens of the form have been hitherto found from the two localities Balmoral Beach, Middle Harbour, near Sydney (Hedley), and Twofold Bay, New South Wales (Iredale).

This is the first record of the species as a fossil, and is a remarkably fine and characteristic example in which the whole of the shell is preserved, from the protoconch to the mature body whorl, and is only slightly damaged on one side. There is another fossil specimen of *B. turritelliforme* in the Dennant Collection, which is also complete and of about the same size as the Sorrento example. This came from the older series of Muddy Creek, from the Balcombian Beds.

Dimensions.—Length, 4 mm. Recent specimens measure 9 mm. and 10 mm. in length respectively (Hedley).

Distribution in Bore.—623 feet, grey calcareous sand-rock with rich shell layers.

Genus CERITHIOPSIS Forbes.

CERITHIOPSIS RETICOSA, sp. nov. Plate VIII., Fig. 50.

Description of Holotype.—Shell small, turreted; four whorls in specimen, probably incomplete, inflated, surmounted by two and a half apical whorls, the summit of which is heterostrophic. The apical portion of the shell is marked with delicate curved striae; the remainder of the whorls ornamented with about twenty fine lirae; these are crossed by three distinct spiral ribs on the median part of each whorl, giving a reticose appearance.

Dimensions.—Length of shell, 2.2 mm.; width of body whorl, .8 mm.

Observations.—The nearest species to the above is *Cerithiopsis cribarioides* T. Woods sp., which is distributed through the Balcombian and Janjukian strata of Victoria. That form, however, is larger and stouter in build, and has an embryonic shell of two flattened whorls, whereas in *C. reticosa* they are distinctly elongated, being higher than wide.

Distribution in Bore.—1,461 feet (holotype), pale grey marl with few shells.

CERITHIOPSIS MITCHELLENSIS, sp. nov. Plate VIII., Fig. 51.

Description of Holotype (Dennant Collection, Mitchell River).—Shell minute, spire rather short for the genus, apical series consisting of two and a half turns, the earliest of which is inflated and finely costate. The succeeding turn is low, becoming more strongly costate. The whorls angulately rounded with three lirae and four to five on the body whorl, which are crossed by about nine or ten of the strong vertical costae. The angulation of the whorl is produced by the intermediate spiral band, which is the strongest and situated a little below the middle line. Intercostal spaces rather deeply excavated and interrupted by the threadlike lirae. Basal part of whorl, keeled, smooth underneath. Aperture, subquadrate. Canal, moderately long and rather strongly twisted.

Dimensions.—Length, 3.5 mm.; width of base, 1.25 mm.

Observations.—There appears to be no species of this genus in Victorian waters which can be closely compared with the fossil form here described. The nearest approach to the present form appears to be *Cerithiopsis semilaevis* T. Woods sp. (May, 1923, pl. XXVII., fig. 6). In that species, however, the shell is proportionately broader at the base, and the apical whorls are more numerous. The median spiral band also does not produce an angulation of the whorl as in the fossil species, and the lirae and costae are of equal strength.

Since this species is better represented in the Dennant Collection, where it was named in MS. by Dennant as *Newtoniella mitchellensis*, we have selected one of the specimens from Mitchell River as a holotype.

Distribution in Bore.—850 feet, dark grey marl with few shells; 1,088 feet, grey marl with small shells; 1,180 feet, grey marl.

Genus ATAXOCERITHIUM Tate.

ATAXOCERITHIUM SEROTINOIDES, sp. nov. Plate VIII., Fig. 52.

Description of Holotype (depth, 1,090 feet).—Shell, turreted with moderate height, rather broad at base. Spire, blunt, of seven moderately rounded whorls with deep suture; apex of two turns, convex smooth, with exception of smooth clathration. Whorls of the spire ornamented with two strong lirae, five on body whorl, crossed by a series of closely set vertical riblets, resulting in a fine clathration. On penultimate whorl vertical ribs number eighteen. Aperture subovate; canal produced and twisted. The clathration on the body whorl becomes weaker towards the base.

Dimensions.—Length, 9 mm.; width at base, 4 mm.

Observations.—We have named the Sorrento species as above, as it suggests relationship with the living *Ataxocerithium serotinum* Adams sp. (May 1921, p. 58; 1923, pl. XXVI., fig. 24), which is a common species around the Tasmanian coasts. It differs from the living forms in having more evenly convex whorls and in the more regularly fenestrated ornament. The apical whorls moreover in the fossil specimen are fewer in number than in the recent. There is already a fossil form of this genus in the Victorian Tertiaries which

was described by Tate under *A. concatenatum* and was taken as the genotype.[1] It is less closely related, however, to the Sorrento specimen than is the living species, for it has a larger number of riblets as well as finer and closer lirae. *A. concatenatum* has been recorded from the Balcombian of Muddy Creek and Mornington and from the Janjukian of the Gellibrand River and Fishing Point, Cape Otway in Victoria, and from the Ninety Mile Desert in South Australia.

Distribution in Bore.—1,090 feet, grey sandy marl with polyzoa, *Spondylus* and *Marginella.*

Fam. Muricidae.

Genus TROPHON Montfort.

Trophon halli, sp. nov. Plate VIII., Fig. 53.

Description of Holotype (depth, 1,107 feet).—Shell fusiform, spire equal to about length of body whorl. Five whorls moderately convex, coarsely costate and slightly shouldered. Sutures distinct. Apical series consisting of one and a half turns, smooth. The succeeding whorls ornamented with about seven or eight strong costae, which are crossed by fine but well marked rounded lirae. The surface of the whorls also vertically striate. Aperture long, ovate, ending in a short siphonate canal. Interior of outer lip with a few denticles and striae; inner lip marked by the surface lirae which disappear towards the interior.

Note on Paratype (Dennant Collection, Bird Rock Cliffs).—This appears to be a slightly broader form of a variable species. The protoconch in this example consist of two turns. The costate and lirate ornament agree with that in the holotype and the chief difference consists in the rather more twisted canal and broader body whorl. All gradations, however, seem to be met with in the examples before us from the Dennant Collection.

Dimensions (*a*) Holotype.—Length, 7.5 mm.; width of body whorl, 2.25 mm. (*b*) Paratype.—Length, 13 mm.; width of body whorl, 5 mm.

Observations.—In the general form of the shell we may compare *Trophon mangelioides* Tate (Tate 1899, p. 270, pl. X., fig. 11) from River Murray Cliffs, South Australia. That species, however, has more convex whorls, and the costation is more numerous. The apical series in both species are very similar. This species appears to be a common form at Bird Rock Cliffs, Torquay, from which locality it was obtained by Mr. Dennant, who named it in manuscript, *Tritonidea halli.*

Distribution in Bore.—1,107 feet, grey sandy marl with *Dentalium.*

Trophon profundus, sp. nov. Plate VIII., Fig. 54.

Description of Holotype.—Shell minute, fusiform. Whorls angulated. Sutures distinct, strongly costate. The ribs number ten on body whorl, rather sharp, narrow and almost nodose on angle of the whorl. The costae are crossed by a series of fine thread-like lirae. Apical series, smooth, convex, mamillate, consisting of two turns. Aperture, elongate ovate. Portion of canal wanting in holotype, but apparently of moderate length and practically straight.

Dimensions.—Length, 4.5 mm.; width of body whorl, 1.75 mm.

---

[1] The dimensions given in the description do not tally with the illustrations, possibly owing to an error in the drawing. The longer dimension in the figure agrees with that of the original description.

Observations.—This distinct shell appears to have no conspecific relationship with any species of *Trophon* found in the Victorian Tertiaries. In the gradated form of the spire it at first sight seemed to resemble certain of the Turrids, but there is a complete absence of sinus or band in the ornamentation and is, we think, a typical *Trophon.*

Distribution in Bore.—1,107 feet, grey sandy marl with *Dentalium;* 1,158 feet, grey sand-rock; 1,170 feet, grey marl.

Fam. Volutidae.

Genus MARGINELLA Lamarck.

Marginella crassidens, sp. nov. Plate IX., Fig. 55.

Description of Holotype (Dennant Collection, Gippsland Lakes).—Shell of moderate size, polished, incrassate; volutiform; spire of medium height; apex pointed; whorls moderately inflated or depressed. Body whorl broad at the shoulder, tapering gently, giving an unequal biconical aspect to the shell. Aperture narrow. Outer lip parallel with the inner finely but distinctly denticulate; channeled at the anterior end. Inner lip with four plats, the three posterior horizontal and the anterior oblique. Externally, the outer lip is depressed and somewhat flange-like, the margin being extended posteriorly over the shoulder of the body whorl and portion of the spire, although in the fossil state, the shell shows indications of olive-coloured markings as vertical striations on the body whorl.

Dimensions.—Length, 7 mm.; greatest width at shoulder, 4 mm.

Observations.—This form shows some relationship to the small species *M. micula* T. Woods. In that form, however, the spire is not so high nor so sharp at the apex. Moreover, the outer lip is not so strongly shouldered, and has a rounder outline that is not so parallel with the inner lip as in the present species. The above species was a manuscript name given by Mr. Dennant to the selected holotype. There is some relationship also with an undescribed species in the Dennant Collection from Table Cape, in which the spire is not so elongated, the outer lip not denticulated, and in which the columellar plates are all more or less oblique.

Distribution in Bore.—902 feet, grey sand rock; 995 feet, grey marl with shells; 1,200 feet, grey sand rock; 1,204 feet, grey sandy marl.

Marginella globiformis, sp. nov. Plate IX., Fig. 56.

Description of Holotype (Dennant Collection, Mitchell River).—Shell minute, thinly built; roundly ovate or sub-pyriform. Spire immersed; apical portion rounded or slightly depressed. Body whorl practically enclosing the preceding series. Outer lip thin, rounded and without denticulations, parallel with the inner margin. Aperture narrow. Four or five plications on the inner lip. The anterior twisted to form the inner margin of the canal. The posterior of the apertural margin projects above the apex.

Dimensions.—Length, 2.4 mm.; greatest width, 1.7 mm.

Observations.—There are apparently no fossil forms with which we can compare the present species. There is a recent form found in the Southern Ocean, *M. multidentata* May, which has the same shape

as *M. globiformis,* but this differs in having a dentate margin to the outer lip and about nine plications on the columellar side. Several specimens of *M. globiformis* occur in the Sorrento bore, but we have selected the holotype from the Dennant Collection on account of the better development of that example. This specimen from the Mitchell River was named in manuscript by Mr. John Dennant.

Distribution in Bore.—1,060 feet, grey sandy marl; 1,070 feet, grey sandy marl; 1,215 feet, grey marl.

Fam. Turridae.

Genus FILODRILLIA Hedley.

Filodrilla steiroides, sp. nov. Plate IX., Fig. 57.

Description of Holotype (Dennant Collection, Mornington).—Shell small, biconical. Suture deeply channeled. Apex acute; whorls angulate; shoulder carinated. Ornament consisting of a strong spiral band above the shoulder and one or two intermediate less conspicuous lirae; the body whorl below the shoulder with about sixteen conspicuous lirae. Aperture elongate, outer lip thin, especially on the sinus-band. Inner lip smooth and thinly callused. Early portion of the shell to the fifth whorl has convex whorls which are closely and evenly costate, in marked contrast to the remainder. In the ephebic stage the surface of the shell is relieved with closely set growth-lines, especially on the sinus-band, and these are continued to some extent across the lirae of the body whorl.

Dimensions.—Length, 6 mm.; width of body whorl, 2.5 mm.

Observations.—This species may be compared with *Filodrillia steira* Hedley (1922, p. 224, pl. XLII., fig. 11) from which it differs in having a more acute spire, a sharper apex and with the whorls of the neanic stage distinctly costate. The angulation of the whorls in *F. steiroides* is more marked than in the recent species and the aperture more elongated. The depth at which the recent species *F. steira* was found ranges from 50 to 111 fathoms off the coast of New South Wales. In the Dennant Collection we find typical specimens of the above form noted as new species of *Hemipleurotoma* and *Asthenotoma,* from Mornington and Shelford.

Distribution in Bore.—1,340 feet, green sandy marl with shells.

Genus EUCITHARA Fischer.

Eucithara subglabra, sp. nov. Plate IX., Fig. 58.

Description of Holotype (depth, 850 feet). — Shell minute, biconical. Whorls four with a blunt apical series of one and a half turns. Convex, smooth. The whorls of the spire moderately convex with about seven stout vertical ribs to each whorl. Body whorl smooth with the exception of a few indistinct lirae at the end of the siphon. Sutures distinctly incised; sinus rather obscure. Aperture narrow, elongate, ovate. Canal short.

Dimensions.—Length, 4.75 mm.; width of body whorl, 2 mm.

Observations.—The nearest species which we select for comparison is the Kalimnan fossil named by Harris (1897, p. 58, pl. III., fig. 10*a-b*) as *Mangelia* (*Cithara*) *glabra,* which occurs in the upper beds at Muddy Creek and at Lakes Entrance. *Eucithara subglabra* differs in being a much smaller and thinner shell, but the earliest series of whorls more distinctly costate as compared with the variably costate character of *E. glabra.* In the present species the body whorl seems to be invariably smooth, whilst in *E. glabra* it is variable, sometimes with slight costation.

Distribution in Bore.—850 feet, dark grey marl with few shells.

Genus ETREMA Hedley.

Etrema trophonalis, sp. nov. Plate IX., Fig. 59.

Description of Holotype (depth, 990 feet).—Shell small. Spire long with a short body whorl. The apical system consists of two and a half turns of smooth and convex whorls ending in a sharp point. The succeeding five whorls, including body whorl, are strongly and narrowly costate having about seven ribs to each turn. The costae are crossed by closely set series of conspicuous lirae, and these continue on base of body whorl where the costae disappear. The interspaces between the costae are finely vertically striate. Canal slightly produced with a distinct twist. Aperture short, ovate. Sutures well marked.

Dimensions.—Length, 7.5 mm.; width of body whorl, 2.75 mm.

Observations.—This species appears to be a true Turrid in its general characters, especially in the form of the apical series which, on account of its pointed shape, was referred in MS. by Dennant to *Oxyacrum.* It differs, however, from any of Dennant's unnamed species in having a shorter body whorl resembling a typical *Trophon.* Hence the present distinctive name.

Distribution in Bore.—990 feet, dark grey marl.

Etrema praespurca, sp. nov. Plate IX., Fig. 60.

Description of Holotype (depth, 470 feet).—Shell minute, biconical, consisting of six whorls of which the first two are smooth and swollen, and the succeeding are angulated and ornamented with seven vertical undulae or depressed riblets. These riblets are more conspicuously developed below the keel on each whorl, which gives to the latter the angulate appearance. These riblets are crossed by one or two spiral lirae and on the body whorl below the angulation there are twelve. The lirae are thin, and about one-third of the width of the interspaces. The fasciole or sinus band constitutes the upper half of the whorls above the body whorl, and the sinus itself is deeply incised. Aperture rather narrow with a blunt opening and with an obtuse termination. Outer lip thin and flexed, more widely open behind and constricted towards the front. Inner lip formed by a smooth shelly plate.

Dimensions.—Length, 4.5 mm.; width of body whorl, 2 mm.

Observations.—This species closely approaches the form of a shell *Etrema spurca* Hinds, as identified and figured by Hedley (1922, p. 284, pl. XLVIII., Fig. 86) from recent beach deposit at

Cairns, Queensland. The chief differences between the present species, and the living *E. spurca* are the more sharply angulated whorls, and the more closely lirate appearance of the surface ornament in the fossil.

Distribution in Bore.—1,050 feet, grey marl; 1,107 feet, grey sandy marl with *Dentalium*.

ETREMA PSEUDOELEGANS, sp. nov. Plate IX., Fig. 61.

Description of Holotype (depth, 1,158 feet).—Shell minute, consisting of four subconvex whorls, surmounted by an apical series of one and a half smooth convex turns. The anterior two-thirds of the whorls are rounded whilst the posterior is flattened or concave and occupied by the band or fasciole. The surface is ornamented with about eleven inconspicuous costae crossed by more thread-like lirae at the intersection of which there are developed distinct granulation. The costae and lirae on the body whorl are more distinct and continuous, and on the surface of the last whorl there are about fourteen of these spiral bands. Sinus deeply incised, aperture shortly ovate. Canal short.

Dimensions.—Length, 5 mm.; width of body whorl, 2 mm.

Observations.—The above name is used to indicate the relationship with the living *Etrema elegans* Hedley (1922, p. 278, pl. XLVII., fig. 77), the type of which was obtained from Albany Passage, Queensland, from 4 to 14 fathoms. The fossil species differs from the living in its blunter protoconch, more rounded whorls, and closer costation.

Distribution in Bore.—1,158 feet, grey sand rock.

Genus GURALEUS Hedley.

GURALEUS VOLUTIFORMIS, sp. nov. Plate IX., Fig. 62.

Description of Holotype (depth, 1,050 feet).—Shell minute, biconical, consisting of three convex whorls and a smooth, acute, apical series of three and a half turns. The two whorls of the spire and the body whorl bear about six well-marked or plicated ribs, which are strong on the anterior, but weaker towards the suture line, posteriorly. The interspaces a little wider than the ribs and marked by fine spiral sulcation. Aperture narrowly elongate. Outer lip thin, narrowly shouldered posteriorly. Inner lip with a narrow, callused plate. Sinus inconspicuous.

Dimensions.—Length, 3 mm.; width of body whorl, 1.5 mm.

Observations.—This species seems to be quite distinct from any living or fossil forms known from the Australian area, although there are one or two recorded from the living faunas which bear a certain resemblance both in form and ornament, but which can be scarcely cited as closely comparable. Our species appears to fall within the genus *Guraleus*, chiefly on account of the type of protoconch, the style of costation, and the inconspicuous sinus. If a comparison were made amongst the many variable living species of the genus, it might possibly be apposite to refer to *Guraleus flavescens* Angas sp. (Hedley 1922, p. 315, pl. LII., fig. 144), a living species from Port Jackson. In this, however, the whorls are more angulated, with a short conical protoconch. One other occurrence of this fossil species is noticed in the Dennant collection, which is recorded from the older beds, Muddy Creek (Balcombian), and there referred to "*Oxyacrum*."

Distribution in Bore.—1,050 feet, grey marl.

Phylum ARTHROPODA.

Super-Order OSTRACODA.

Fam. Cytheridae.

Genus CYTHERE Müller.

Cythere laganella G. S. Brady.

Cythere laganella G. S. Brady 1880, p. 63, pl. XVI., figs. 7*a-d*.

Observations.—Although this species appears rather too depressed and polished to typically conform to species of this genus, as already suggested by Dr. Brady's query, it is evident from the hinge characters that it must still be referred to *Cythere*. Our fossil examples compare very closely with the living specimens dredged by the "Challenger," in Torres Straits, in 155 fathoms.

Distribution in Bore.—719 feet, grey incoherent sand-rock; 726 feet, grey sand-rock with shells.

Cythere sorrentae, sp. nov. Plate IX., Figs. 63*a, b*.

Description of Holotype (depth, 1,088 feet).—Valve, left, seen from the side, elongate; broad anteriorly, tapering towards posterior; depressed anteriorly with a marginal border of moderate depth. Ventral edge straight; dorsal edge straight and meeting the posterior extremity at a sharp angle. The anterior margin rounded at the ventral angle and widely curving away to the dorsal. Caudal extremity ornamented with a few blunt tubercles and a stronger one at the dorsal angle. Surface rising rapidly from anterior, and highest in the posterior third. In the median area is a low tubercle, whilst towards the ventral border the surface rises posteriorly into a somewhat sharp salient spine. There is also a sharp spine developed near the dorsal margin, pointing outwards and downwards. Surface ornamentation consisting of rather delicate and sometimes flexuous costae, along the lines of which are often seen the basis of fine prickles. Surface of shell delicately punctate. Anterior margin ornamented with a series of short prickles.

Observations.—This species seems to show some relationship to another Tertiary ostracod met with in this series, and also in the Tertiary deposits of the Mallee bores named *C. flexicostata* Chapman (1914, p. 35, pl. VII., figs. 14*a, b*), but the latter species is quite distinct in having stronger and more flexuous costation, although the general form of the valves of the species resemble one another.

Dimensions.—Length, 1.07 mm.; height, .5 mm.; width of carapace, circ., 1.6 mm.

Distribution in Bore.—938 feet, dark coloured marl, with small gasteropods; 1,088 feet, grey marl, with small shells; 1,090 feet, grey sandy marl, with polyzoa, *Spondylus* and *Marginella*.

Cythere lactea Brady.

Cythere lactea Brady 1865, p. 377, pl. LX., fig. 3*a-c*. Id. 1880, p. 91, pl. XXII., figs. 1*a-d*.

Observations.—It is interesting to note that this species was originally described from shallow water sand from the Australian coast, probably in the neighbourhood of Port Phillip. Our fossil specimens are very like Brady's original figures. On the other hand, the "Challenger"

specimens referred to this species obtained from mid-Pacific at 420 fathoms are not quite typical, according to the original description, for in them the carapace is much thicker and the median boss less pronounced.

Distribution in Bore.—1,360 feet, pale grey, sandy marl, with polyzoa and shells.

CYTHERE POLYTREMA Brady.

Cythere polytrema Brady 1878, p. 393, pl. LXVI., figs. 1*a-d.* Id. 1880, p. 87, pl. XIXI., figs. 5*a-h.* Chapman 1926, p. 102, pl. XXI., fig. 12. Id., 1916, p. 50, pl. VI., fig. 3. Id. 1919, p. 27.

Observations.—This species, which dates from strata as old as the Upper Eocene of New Zealand, has not been recorded before from the Australian tertiary. The examples from the Sorrento bore are quite typical. A fair number of characteristic valves have been found in the Pleistocene on the slopes of Mt. Erebus in the Antarctic.

Distribution in Bore.—684 feet, grey calcareous sand-rock, with a few badly preserved shells; 758 feet, greenish-grey marl.

CYTHERE CAUDISPINOSA, sp. nov. Plate IX., Figs. 64*a, b.*

Description of Holotype (640 feet.)—Valve compressed towards dorsal side rising fairly rapidly towards the ventral border. Anterior margin moderately broad, rounded. Dorsal margin angulate, extended to a point which is beset with long slender spines. Surface of valve showing the median tubercle distinct but not prominent. The anterior and the ventral marginal ridges continuous. At the postero-dorsal angle a sharp, distinctly produced spine. Surface ornament closely reticulated with polyzonal lineations. The aureole of the median area not distinctly radiate. Edge view, elongate, rhomboidal, with the extremity of the ventral marginal ridge forming an alate process.

Dimensions.—Length, .8 mm. Greatest width, .5 mm.

Observations.—The above species, which also occurs in these deposits, is clearly related to *Cythere rastromarginata* G. S. Brady (1880, p. 83, pl. XVI., figs. 1*a-d*, 2*a-d*), but differs in many important details which we regard as specific, e.g., the valves in *C. caudispinosa* are more acuminate posteriorly, and ending in a distinct fringe of spines; the surface ornament is also more irregular in its aureolate character, and the median tubercle is not so pronounced. In regard to the distribution in the recent species (*C. rastromarginata*), it is interesting to notice that besides the specific example from Honolulu, it was found off East Moncoeur Island, Bass Strait, in 38 to 40 fathoms.

Distribution in Bore.—605, 640, 670, 730, 1,060, 1,088 feet.

CYTHERE PUMILA G. S. Brady.

Cythere pumila Brady 1865, p. 378, pl. LX., figs. 7*a-d.*

Observations.—It is of great interest to meet with this distinct little species in the fossil deposits of the Sorrento bore. The only other occurrence appears to be the original one of Dr. Brady's from recent dredgings off Australia (probably Port Phillip). There are four valves in the present series. Brady's type was founded on one separate valve.

Distribution in Bore.—467 feet, grey, calcareous sandstone; actually a consolidated foraminiferal sand.

Cythere reussi G. S. Brady.

Cythere reussi Brady 1868, p. 153, pl. XVIII., figs. 9, 10. Idem. 1880, p. 74, pl. XIV., figs. 2*a-d*.

Observations.—This is apparently the first occurrence of the species as a fossil. The recent specimens have been recorded off Booby Island, Honolulu, and Straits of Magellan. The original specimen came from Colon Aspinwall. The fossil specimen from Sorrento is rather coarser in structure, and the intermediate spaces between the surface pittings are inclined to be tubercled.

Distribution in Bore.—1,050 feet, grey marl.

Cythere militaris Brady sp.

Cythereis militaris Brady 1868, p. 385, pl. LXI., figs. 9*a-d*.

Cythere clavigera Id. 1880, p. 109, pl. XXIII., figs. 7*a-d*.

Cythere militaris Brady sp. Chapman 1914, p. 37, pl. VII., fig. 18. Id. 1919, p. 26, pl. XXI., fig. 8.

Observations.—In recording the above species from the Kalimnan in later Janjukian of the Mallee bores, it was pointed out by one of us the advisability of regarding *C. clavigera* and *C. militaris* as conspecific, and also that the *militaris* form, as figured by Brady 1868, represents the young stage. In the examples found in the Sorrento bore we note that in two instances, at the depth of 990 and 997 feet, the adult *clavigera* form is found, whilst the original *militaris* type occurs at 605 feet. It appears from comparison of specimens that the hystricated crest is not developed until the later stages of the valve development. The original specimens of G. S. Brady (*C. militaris*) came from Hobson's Bay, Victoria, whilst the "Challenger" specimens represented, *C. clavigera,* came from Port Jackson, New South Wales. The examples from the Mawson Antarctic Expedition came from the great depth of 2,600 fathoms, in the Southern Ocean.

Distribution in Bore.—605 feet, grey calcareous sand-rock, with shells; 990 feet, dark grey marl; 997 feet, grey marl.

Cythere baragwanathi, sp. nov. Plate X., Figs. 65*a, b*.

Description of Holotype (489 feet).—Valve as seen from the side subrectangular, moderately elongate. Dorsal margin gently convex; ventral straight. Carapace higher anteriorly. Antero-dorsal angle somewhat truncate, forward, projecting ventrally. Posterior border bluntly rounded. Surface ornament consisting of moderately coarse pittings arranged in nearly parallel lines on the ventral region and curving round concentrically to a characteristic sulcus which lies transversely to the anterior third. This sulcus commences from the depressed flange of the hinge line and extends nearly across the width of the carapace. The anterior margin of the valve has a depressed flange bearing a few sharp tubercles. From the highest part of the posterior third, the valve slopes down rapidly to the border, and on the postero-ventral angle there is an outwardly directed and short spine.

Dimensions.—Length, 1 mm.; height, .6 mm.; thickness of carapace, .5 mm.

Observations.—This very distinct form belongs to a type of valve which is represented in *Cythere hodgei* G. S. Brady (1865, p. 373, pl. LIX., figs. 3*a-d*). In *C. hodgei* we have the typical "peach stone" form of carapace, but it differs from *C. baragwanathi* in being more elongate and having no sub-median sulcus. At the depth of 489 feet the present species is very abundant.

Distribution in Bore.—476 feet, grey, calcareous sandstone; 489 feet, dark clay, with numerous shells.

Genus LOXOCONCHA G. O. Sars.

Loxoconcha alata Brady.

Loxoconcha alata G. S. Brady 1868, p. 223, pl. XIV., figs. 8-13. Idem. 1880, p. 122, pl. XXVII., figs. 6*a-j*.

Observations.—The example of this species from the Sorrento bore show a considerable amount of variation from the "Challenger" specimens from Honolulu and Mauritus. But there is no doubt that both our examples and the recent forms are conspecific. In the Sorrento specimens the surface ornament is usually more irregularly reticose, and the posterior aliform process less conspicuous than in living examples. At the present day this species seems indicative of coral reef faunas, at shallow depths.

Distribution in Bore.—623 feet, a grey calcareous sand-rock, with rich shell layers; 850 feet, dark grey marl, with few shells.

Genus BYTHOCYTHERE G. O. Sars.

Bythocythere keblei, sp. nov. Plate X., Fig. 66 *a, b*.

Description of Holotype (from 623 feet).—Valve seen from the side, subrectangular. Anterior border rounded, more obliquely to the dorsal margin. Posterior subangulate and slightly produced. Ventral margin notched anteriorly at junction of anterior border, sloping away to the subacuminate posterior. Surface of valve highest in the middle, gently sloping anteriorly, and bordered by distinct flange. Posteriorly rather inflated in the lower third, and sharply curving down to the caudate posterior. The surface is relieved by a sub-median swelling towards the upper third, whilst the marginal region of the ventral is produced into an alate expansion with two blunt spinose processes directed posteriorly. Surface practically smooth except for a few punctuations scattered widely over the surface.

Dimensions.—Length, .65 mm.; height, .38 mm.

Observations.—Probably the nearest related species is *Bythocythere orientalis* G. S. Brady (1880, p. 141, pl. VI., figs. 6*a-d*). The present species differs, however, in having a steep ventral border relieved with one or two spines. In the reference just given Dr. Brady has included under *B. orientalis* another form which he regards as a variety, but which to us appears a distinct species. The living *B. orientalis* was obtained by the "Challenger" from the depth of 7 fathoms in Hong Kong Harbour, whilst his aberrant form came from Torres Strait.

Distribution in Bore.—623 feet, grey calcareous sand-rock, with shell layers.

Genus CYTHERURA G. O. Sars.

Cytherura cf. lilljeborgii, G. S. Brady.

Cytherura lilljeborgi G. S. Brady 1880, p. 132, pl. XXXII., figs. 6*a-d*.

Observations.—The present specimen is a left valve; it agrees with the above species in surface sculpture, the only difference being in the more distinctly depressed anterior and the greater height of the valve as compared with the "Challenger" specimens, which came from Balfour Bay, Kerguelen Island, 20-50 fathoms.

Distribution in Bore.—674 feet, grey shell marl, with thick bands of mollusca.

Cytherura praemucronata, sp. nov. Plate X., Fig. 67*a, b*.

Description of Holotype (from 1,088 feet).—Valve seen from the side, sub-rhomboidal. Dorsal margin nearly straight, truncately curving to the anterior border, which is well rounded. Ventral margin straight and sloping narrowly to the mucronate posterior. The mucro is well developed. Surface of valve very high ventrally in the middle region, sloping steeply to the dorsal and posterior margins, and more evenly and gradually to the anterior. The surface of the valve in the anterior region is rather depressed, with a slight marginal flange, the external edge of which, towards the ventral, is ornamented with a series of sharp prickles. The posterior region of the valve is somewhat depressed, and this depression is extended along the posterior margin. Surface of valve strongly and coarsely punctate, the punctae not being arranged, as is often the case in species of this genus, in regular series.

Dimensions.—Length of valve, .8 mm.; height, .5 mm.; thickness of carapace, .53 mm.

Observations.—This species is evidently related to Brady's *C. mucronata* (G. S. Brady 1880, p. 133, pl. XXXII., figs. 9*a-d*). It differs, however, in having a decidedly higher and deeper carapace, and a longer and stouter mucro, whilst the ornament consists of a coarser punctation, without the parallel arrangement seen in Brady's species, which was dredged in Simon's Bay, South Africa, at 15 to 20 fathoms.

Distribution in Bore.—1,088 feet, grey marl, with small shells.

Genus CYTHEROPTERON G. O. Sars.

Cytheropteron praeantarcticum Chapm.

Cytheropteron praeantarcticum Chapm. 1914, p. 47, pl. IX., figs. 39*a-b*.

Observations.—It is interesting to note the second occurrence of the above species, which is confined to fossil deposits in the upper Victorian Tertiaries. It was previously described from the Mallee bores, from bore 9,256–9,263 feet, in which the deposit had a Kalimnan facies. The Sorrento specimens show slight variations in some cases from the holotype, but are not even fixed enough for variable distinction.

Distribution in Bore.—476 feet, 598 feet, 670 feet, 674 feet.

Section PLATYCOPA G. O. Sars.

Fam. Cytherellidae.

Genus CYTHERELLA T. R. Jones.

Cytherella punctata G. S. Brady.

Cytherella punctata G. S. Brady 1865, p. 362, pl. LVII., figs. 2*a-b*. Idem. 1880, p. 174, pl. XXXVI., figs. 6*a-b*; pl. XLIV., figs. 4*a-g*. Chapman 1914, p. 51, pl. IX., fig. 47; Idem. 1926, p. 106, pl. XXII., figs. 15–16.

Observations.—The specimens from the Sorrento bore, as a rule, differ rather considerably from the living species in having a coarser punctation. Otherwise the fossil and recent forms are indistinguishable. It has been recorded as a Tertiary fossil from the Mallee bores in both Janjukian and Kalimnan strata, and occurs in the grey marls of Weka Creek, New Zealand.

Distribution in Bore.—605 feet, 623 feet, 630 feet, 640 feet, 654 feet, 661 feet, 694 feet, 741 feet, 746 feet, 786 feet, 976 feet, 990 feet, 997 feet, 1,034 feet, 1,060 feet, 1,088 feet, 1,107 feet, 1,150 feet, 1,164 feet, 1,259 feet, 1,310 feet, 1,360 feet, 1,461 feet, 1,465 feet, 1,549 feet, 1,560 feet.

Cytherella sulcosa, sp. nov. Plate X., Fig. 68*a, b*.

Description of Holotype (from 997 feet).—Valve seen from the side, elongate, ovate. Dorsal side gently rounded, shorter than the ventral, which is nearly straight. Posterior margin rather angularly rounded. Anterior evenly rounded, and at the extreme margin ornamented with a fringe of delicate prickles, which extends around the ventral nearly to the posterior. Surface of valve highest in the posterior third, sloping rather steeply towards the anterior border; the latter area is somewhat convexly swollen. The valve is more depressed on the dorsal side and rather steeply curving to the ventral. Surface smooth or marked with irregular wide depressions and a few faint lineations on the anterior and posterior.

Dimensions.—Length, .7 mm.; height, .4 mm.; thickness of carapace, 135 mm.

Observations.—This species appears to be a very distinct form, without any decided relationship to any other of the ovate types of *Cytherella*. The sulcated carapace is also seen in *C. punctata,* but in the present species it extends across the carapace, and not limited to the dorsal side as in that species.

Distributon in Bore.—997 feet, grey marl.

Cytherella intermedia, sp. nov. Plate X., Figs. 69*a, b*.

Description of Holotype (from 1,088 feet).—Valve seen from the side, sub-rectangular. Dorsal margin, straight, truncately rounded at the posterior. Ventral margin slightly concave. Anterior extremity broadly rounded and bordered by a deep sulcus, which gives the margin a flange-like appearance. Posterior narrower than the anterior, well rounded and margined by a thickened flange. On the ventral side it is continued as far as the middle, where it disappears behind the anterior flange. Valve highest towards the ventral and slightly below the median area, sloping rapidly to the dorsal margin and more gently

towards the anterior. The position of the muscle-spot is marked by a depression, which disappears towards the dorsal in an oblique sulcus. Surface of shell smooth, excepting for a very fine punctation.

Dimensions.—Length, .82 mm.; height, .5 mm.; thickness of carapace, .5 mm.

Observations.—This interesting species shows certain resemblances between several forms of *Cytherellae* of the type of *Cytherella auricula* Chapman (1914, p. 49, pl. IX., figs. 42*a-b*, 43). In the latter species the encircling flange is distinctly rounded, whereas in *C. intermedia* it is sharp and salient. As regards the sub-crescentic bar seen in *C. auricula,* the nearest approach to this in the present species is the curved ridge-like humidity in the median area of the valve; whilst instead of a large depressed area in the centre, this is seen in *C. intermedia* as a sub-median pit. Moreover, in the latter species the posterior extremity is much narrower than the anterior. Comparing *C. intermedia* with *C. cingulata* Brady (1880, p. 177, pl. XLIII., figs. 1*a-f*, 2*a-d*), we find a sharp marginal flange instead of a rounded one present in this species. In *C. cingulata* the posterior extremity is broad and truncate rather than produced, as in the present species. In one variety figured by Brady there is a central pit which compares closely, except in position, with that seen in *C. intermedia.* The outlines of the two species, however, differ considerably.

Distribution in Bore.—1,025 feet, 1,088 feet, 1,090 feet, 1,107 feet, 1,138 feet, 1,310 feet.

CYTHERELLA ARANEOSA, sp. nov. Plate X., Figs. 70*a, b.*

Description of Holotype (1,360 feet):—Valve seen from the side, elongate, ovate. Dorsal margin broadly curved; ventral margin longer, and nearly straight. Extremities rather evenly rounded. The carapace is highest in the posterior third, sloping away gradually to the anterior. Surface marked with a network of very fine raised lines. Anterior extremity margined with closely set series of small prickles which extend half way down on the ventral margin. A muscle-spot is seen in the median situated towards the dorsal line consisting of curved double rows of elongate impressions; about ten in each row.

Dimensions.—Length, .84 mm.; height, .5 mm.; thickness of carapace, .42 mm.

Observations.—In the form of outline and the finely reticulate ornament, the above species closely resembles Brady's *Cythere serratula* (Brady 1880, p. 77, pl. XLIII., figs. 7*a-d*). It differs, however, in having a distinct series of moderately coarser aculeations on the posterior extremity, whilst the only marginal ornament in *Cytherella araneosa* is that of fine prickles. In regard to Dr. Brady's determination of his species as doubtfully belonging to *Cythere* there seems to be strong evidence from our point of view that it should be regarded as *Cytherella,* which is supported by the fact that the edges of the valves are not modified for locking as in *Cythere.*

Distribution in Bore.—1,360 feet, pale grey, sandy marl.

CYTHERELLA AURICULA Chapm.

Cytherella auriculus Chapman 1914, p. 49, pl. IX., figs. 42*a-b*, 43.

Observations.—The present series of valves shows the median ridges ornament to be of very variable character. It is distinguished from

C. intermedia sp. nov. in having the raised margin rounded rather than carinate. It is one of an interesting group of which extremes are found in the Cretaceous species *C. williamsoniana* Jones (1849, p. 31, pl. LII., figs. 26*a-h*. Idem. 1890, p. 48, pl. III., figs. 55-62). In the somewhat broken character of the median ornament our species also resembles *C. chapmani* Jones (1890, p. 49, pl. III., fig. 70), in having the ridges rather narrow and constricted. *Cytherella praeauricula* Chapman (1926, p. 105, pl. XXII., fig. 13), of the Upper Eocene grey marl of Weka Creek, New Zealand, is evidently related to the above species, but in this form the median costation is more irregular and tumid.

In regard to the valves of the species from the Sorrento bore, it is seen that the outline of the valves, although fairly constant, shows in some instances a decided narrowing or elongation of the carapace.

Super-Order CIRRIPEDIA.

Fam. Scalpellidae.

Genus SCALPELLUM Leach.

Scalpellum (Arcoscalpellum) dunni,[1] sp. nov.
Plate X., Figs. 71*a, b*.

Description of Holotype (Carina, 661 feet).—Narrow, strongly arcuate, especially towards the upper half. Basal margin subacute. Apex acute. Tectum moderately arched with a slight median ridge. Parietes narrow, less than half the width of the tectum, and bent nearly at right angles to it. Growth-lines acutely angular, slightly raised; the apex of the angles not sharp but slightly rounded.

Dimensions.—Length, 6 mm.; width, 1.5 mm.

Observations.—This species bears a general resemblance to *Scalpellum* (*Arcoscalpellum*) *ungulatum* Withers (Withers, 1924, p. 8, pl. I., figs. 1-11), but with the distinct differences of its minute size and the present carinal valve being more strongly arcuate.

Distribution in Bore.—661 feet, calcareous sand-rock; 730 feet, grey calcareous sand-rock.

Scalpellum (?Arcoscalpellum) meridianus, sp. nov. Plate X., Figs. 72*a, b*.

Description of Holotype (Tergum, 1,230 feet).—Sub-triangular; the upper part acute and elongated, the lower part broadly rounded. Carinal edge slightly concave and thickened; occludent edge, straight. Two faint divergent keels apparent on the surface. Under careful lighting a series of fine radiating striae are apparent.

Dimensions.—Length, 4.5 mm.; width, 2.5 mm.

Observations.—This species can be compared with the tergum of *Scalpellum* (*Arcoscalpellum*) *ungulatum*, but in the present form it is longer and more acute in the upper part, and the basal portion more widely rounded, whilst its margins are abnormally concave.

Distribution in Bore.—1,230 feet, grey sandy marl.

---

[1] Named in recognition of the former Director of the Geological Survey of Victoria.

Fam. Balanidae.

Genus **BALANUS** Lister.

Sub-genus **MEGABALANUS** Hoek.

Balanus (Megabalanus) decorus Darwin.

Balanus decorus Darwin 1854, p. 212, pl. II., figs. 6*a-b*.

Balanus psittacus Molina sp. Chapman, 1914, p. 53, pl. X., figs. 52*a-b*.

Observations.—The plates of this species are represented by compartments only. They compare very closely with those found in the Mallee bores, which were referred to *Balanus psittacus* Molina sp. Mr. Thos. H. Withers has reviewed this determination by correspondence, and regards the Mallee specimens as referable to *B. decorus*. One distinguishing feature which separates *B. decorus* from *B. psittacus* is the cancellated parietes in the latter. Darwin had previously remarked on the close similarity in the appearance of the two forms (Darwin, 1853, p. 213). Curiously enough a specimen which seems to be referable to *B. psittacus* now occurs in a lower horizon of the bore (*infra cit.*).

Balanus (Megabalanus) cf. psittacus Molina sp.

Lepas psittacus Molina, 1888, p. 223.

Balanus psittacus Molina sp. Darwin 1854, p. 206, pl. II., figs. 3*a-d*. Pilsbury, 1916, p. 75, pl. XVII., figs. 1-4; pl. XVII., figs. 1-3.

Observations.—A single example of a compartment, apparently of the above species, occurs in the bore at 623 feet. It measures 8.25 mm. by 5 mm. at the widest part. The surface of the parieties is distinctly and evenly ribbed. Sutural edges of alae smooth. The parietal tubes are comparatively large in our specimen, a feature remarked upon by Darwin in his description of *B. psittacus*. The radii are wide and projecting beyond the parietes, and their tubes are coarse and crenulated.

Distribution in Bore.—623 feet, grey calcareous sand-rock.

Sub-genus **BALANUS** da Costa.

Balanus (Balanus) amphitrite Darwin, var. acutus Withers.

Balanus varians Chapm. (non Sow.) 1914, p. 54, pl. X., figs. 53, 54.

Balanus (*Balanus*) *amphitrite* Darwin var. *acutus* Withers, 1924, p. 30, pl. VI., fig. 8, pl. VII., figs. 11, 12; pl. VIII., figs. 1-4.

Observations.—T. H. Withers, in describing New Zealand specimens of this variety of Darwin's species (Darwin, 1854, p. 240, pl. X., figs. 53, 54), remarks in a footnote (op. supra cit. p. 30), in reference to Victorian fossil examples which I had previously figured and described

as *B. varians* Sow.:—"The shell and carinal compartment from the Mallee borings (Miocene or Lower Pliocene), figured by Chapman (1914, p. 54, pl. X., figs. 53, 54), as *Balanus varians,* are, as I know from an examination of the originals, identical in every respect with two shells without opercular valves, in the Geological Department of the British Museum, registered I., 204, In. 19992. These two latter shells came from the Miocene of Bairnsdale, Victoria, and were presented by Mr. W. H. Grignon[1] (1882). All the shells undoubtedly belong to the species *Balanus amphitrite* Darwin, and, although, in the absence of the opercular valves, it cannot be positively asserted, they are apparently the same as the form here described as *B. amphitrite* var. *acutus* nov. Both the New Zealand and Australian shells agree in having the parietes flecked with short, whitish, and irregularly placed longitudinal markings."

Parietal valves are fairly common at two depths in the present boring, which are identical with those from the Mallee bores. Although opercular plates are not present, there is little doubt that these parietes are referable to the species and variety described by Withers. The general form of the shell is indicated by the parietes being steeper than in the species, and the strong and numerous ribbing in the interior is similar to that in the Mallee specimens, and correspondingly with the New Zealand; the radii also are septate and finely denticulate at the margins. The New Zealand specimens were described by T. H. Withers from the Miocene of the Mount Brown beds and the Lower Waipara Gorge, North Canterbury.

Distribution in Bore.—324 feet, calcareous and quartzose sand and grit; 741 feet, grey calcareous sand-rock.

Phylum VERTEBRATA.

Class PISCES.

A large number of otoliths have been selected from the washings and siftings of the material from the Sorrento bore. However, until some systematic study of these structures, based on the fish fauna of the Southern Ocean, has been attempted, it seems unwise to encumber literature with identifications based on Teleostean fish remains from the Tertiary basins of the old Mediterranean region.

This group of the Teleosteans are not so world-wide in their specific distribution as are the Selachians, and therefore such broad comparisons are only of value in that they are figured and diagnosed for future review.

Already a great deal of descriptive work on fossil fish otoliths has been carried out by Koken, Schubert, Priem and Frost. Up to 1914, the literature on this subject is given in a later paper on "Otoliths of Fishes from the Tertiary Formations of New Zealand," by G. Allan Frost, who bases his generic identifications on those of Schubert's (see Trans. N.Z. Inst., vol. LV., pp. 605-614, pls. LXI., LXII.).

---

[1] This name should read W. H. Gregson; for many years he was on the staff of the Victorian Lands Department, and collected fossils in the area round Bairnsdale.—F. C.

IV.—CLASSIFIED LIST OF FOSSILS WITH THEIR DEPTHS IN THE BORE.

Phylum PROTOZOA.

Order FORAMINIFERA.

Fam. MILIOLIDAE.

Genus BILOCULINA d'Orb.

Biloculina elongata d'Orb.
768, 990, 997, 1088, 1107, 1138, 1461 ft.

Biloculina angusta Chapm.
995 ft.,

Biloculina ringens Lam.
670, 1191, 1330 ft.

Biloculina bulloides d'Orb.
630, 660, 694, 800, 850, 902, 938, 976, 990, 995, 997, 1025, 1050, 1060, 1088, 1107, 1160, 1170, 1180, 1200, 1286, 1295, 1318, 1320, 1340, 1360, 1608, 1658, 1680 ft.

Biloculina bradyi d'Orb.
902, 938, 995, 1025, 1050, 1060, 1070, 1107, 1158, 1170, 1180, 1191, 1204, 1215, 1230, 1232, 1240, 1286, 1318, 1320, 1461, 1615 ft.

Biloculina sarsi Schl.
640, 730, 850, 976, 997, 1060, 1107, 1191, 1204, 1295, 1330, 1340 ft.

Biloculina depressa d'Orb.
758, 995, 1025, 1090, 1158, 1160, 1200, 1220, 1286, 1318 ft.

Biloculina laevis Defr. sp.
1138, 1320 ft.

Biloculina irregularis d'Orb.
826, 990, 997, 1050, 1088, 1090, 1160, 1191 ft..

Biloculina tubulosa Costa..
746 ft.

Genus SPIROLOCULINA d'Orb.

Spiroloculina acutimargo Brady.
730 ft.

Spiroloculina dispansa Chapm.
605, 630, 640, 660, 661, 690, 719, 730, 741, 758, 902, 938, 1138, 1158, 1170, 1180, 1191, 1204, 1215, 1230, 1232, 1240, 1259, 1310, 1360, 1400 ft.

Spiroloculina asperula Karr.
630, 640, 1580 ft.

Spiroloculina arenacea Brady.
1070, 1158 ft.

Genus TRILOCULINA d'Orb.

Triloculina oblonga Montf. sp.
623, 670, 902, 1050, 1160 ft.

Triloculina circularis Börn.
623, 826, 850, 1158 ft.

Genus **QUINQUELOCULINA** d'Orb.

Triloculina trigonula Lam. sp.
585, 690, 694, 700, 730, 990, 995, 997, 1025, 1034, 1050, 1060, 1070, 1088, 1107, 1191, 1232, 1318, 1360, 1470, 1680 ft.

Triloculina tricarinata d'Orb.
476, 585, 598, 605, 623, 674, 690, 694, 719, 730, 741, 758, 800, 850, 1050, 1060, 1070, 1088, 1090, 1138, 1160, 1191, 1200, 1204, 1376, 1560, 1608 ft.

Quinqueloculina seminulum L. sp.
476, 489, 585, 605, 618, 674, 694, 726, 730, 758, 938.

Quinqueloculina gracilis d'Orb.
938 ft.

Quinqueloculina subrotunda Mont. sp.
690 ft.

Quinqueloculina vulgaris d'Orb.
476, 585, 605, 618, 623, 630, 640, 654, 660, 661, 670, 684, 694, 700, 719, 726, 730, 741, 746, 758, 768, 786, 826, 850, 902, 938, 990, 995, 997, 1025, 1034, 1050, 1060, 1070, 1088, 1090, 1107, 1138, 1150, 1158, 1160, 1170, 1180, 1191, 1200, 1204, 1215, 1220, 1230, 1232, 1240, 1259, 1286, 1295, 1310, 1318, 1320, 1330, 1333, 1340, 1376, 1400, 1426, 1461, 1465, 1470, 1490, 1560, 1580, 1608, 1615, 1640, 1658, 1667, 1680, 1693 ft.

Quinqueloculina lamarckiana d'Orb.
690, 694, 741, 850, 902, 938, 990, 997, 1025, 1034, 1050, 1060, 1088, 1090, 1107, 1150, 1158, 1160, 1170, 1180, 1191, 1200, 1220, 1230, 1232, 1240, 1259, 1286, 1295, 1318, 1320, 1330, 1333, 1340, 1376, 1400, 1426, 1446, 1461, 1465, 1470, 1490, 1525, 1549, 1560, 1580, 1608, 1615, 1640, 1658, 1667, 1680, 1693 ft.

Quinqueloculina schreiberiana d'Orb.
694, 700, 730, 758, 850, 902, 938, 990, 995, 1025, 1034, 1050, 1060, 1088, 1090, 1107, 1158, 1160, 1164, 1170, 1191, 1200, 1215, 1220, 1232, 1240, 1259, 1295, 1318, 1320, 1340, 1400, 1410, 1426, 1461, 1465, 1470, 1490, 1509, 1525, 1560, 1580, 1608, 1615, 1640, 1693 ft.

Quinqueloculina ferussacii d'Orb.
661, 730, 902, 990, 995, 997, 1034, 1070, 1090, 1160, 1232 ft.

Quinqueloculina bicornis W. & J. sp.
476 ft.

Quinqueloculina linnaeana d'Orb. sp.
694, 1050, 1088, 1107, 1150, 1160, 1191, 1200, 1204, 1220, 1240, 1259, 1330, 1400, 1410, 1470 ft.

Quinqueloculina carinata d'Orb.
990 ft.

Quinqueloculina contorta d'Orb.
598 ft.

Quinqueloculina polygona d'Orb
694, 768, 786, 938, 1070, 1090, 1107, 1465 ft.

Quinqueloculina agglutinans d'Orb. sp.
598, 654, 726, 730, 741, 758, 850, 902, 938, 990, 995, 997, 1025, 1034, 1088, 1090, 1107, 1150, 1160, 1164, 1170, 1180, 1200, 1215, 1220, 1230, 1232, 1240, 1295, 1318, 1360, 1461, 1465, 1525, 1549, 1560, 1580, 1658, 1680, 1693 ft.
Quinqueloculina sclerotica Karr. sp.
1107 ft.

Genus **MASSILINA** Schlumberger.

Massilina secans d'Orb sp.
605 ft.

Genus **SIGMOÏLINA** Schlumberger.

Sigmoïlina celata Costa sp.
694, 1164, 1615 ft.
Sigmoïlina sigmoidea Brady sp.
623, 990, 997, 1060, 1138, 1461, 1580, 1680, 1693 ft.

Fam. Ophthalmidiiae.

Genus **CORNUSPIRA** Schultze.

Cornuspira involvens Rss. sp.
605, 690, 730, 995, 997, 1025, 1164, 1232, 1410, 1509, 1525, 1608 ft.
Cornuspira carinata Costa sp.
1150 ft.
Cornuspira foliacea Phil. sp.
605, 660, 694, 741, 758, 997, 1025, 1070, 1088, 1107, 1204, 1310, 1470, 1580, 1693 ft.
Cornuspira striolata Brady.
605, 623, 630, 640, 694, 730, 1191, 1240, 1286, 1318, 1320, 1330, 1360, 1400, 1461, 1549, 1580, 1608, 1615, 1658, 1667, 1680, 1693 ft.
Cornuspira crassisepta Brady.
654, 758, 976, 990, 995, 997, 1025, 1034, 1107, 1170, 1180, 1215, 1220, 1230, 1232, 1259, 1286, 1318, 1320, 1330, 1340, 1360, 1376, 1465, 1470, 1549, 1560, 1580, 1658, 1680 ft.

Genus **PLANISPIRINA** Seguenza.

Planispirina exigua Brady.
1060, 1070, 1090 ft.
Planispirina sphaera d'Orb. sp.
997 ft.

Fam. Ammodiscidae.

Genus **AMMODISCUS** Reuss.

Ammodiscus incertus d'Orb. sp.
1560 ft.

Fam. Lituolidae.

Genus **HAPLOPHRAGMOIDES** Cushman.

Haplophragmoides sphaeroidiniforme Brady sp.
976, 1180, 1330, 1333, 1340, 1426, 1461, 1549, 1560, 1640, 1667, 1680 ft.

Fam. Textulariidae.

Genus TEXTULARIA Defrance.

Textularia abbreviata d'Orb.
605, 630, 730, 997, 1088, 1295, 1330, 1333, 1376, 1426, 1446, 1461, 1465, 1470, 1549, 1560, 1615, 1658, 1680, 1693 ft.

Textularia gibbosa d'Orb.
605, 938, 976, 1060, 1107, 1200, 1215, 1220, 1232, 1259, 1330, 1333, 1549, 1608, 1615 ft.

Textularia gibbosa var. *tuberosa* d'Orb sp.
741, 1204 ft.

Genus SPIROPLECTA Ehrenberg.

Spiroplecta gramen d'Orb. sp.
623, 640, 1220, 1240, 1259, 1286, 1318, 1320, 1330, 1461, 1470, 1658, 1667 ft.

Spiroplecta carinata d'Orb. sp.
605, 623, 640, 690, 694, 730, 758, 1138, 1259, 1658 ft.

Spiroplecta nussdorfensis d'Orb. sp.
694, 1615, 1680 ft.

Spiroplecta sagittula Defr. sp.
598, 630, 938, 990, 1180, 1232, 1295, 1320, 1330, 1340, 1400, 1549, 1580, 1608, 1615, 1640, 1658, 1667, 1680 ft.

Spiroplecta sagittula Defr. var. *fistulosa* Br.
598, 995, 997, 1034, 1088, 1107, 1138, 1230, 1310, 1400 ft.

Genus GAUDRYINA d'Orbigny.

Gaudryina pupoides d'Orb.
730 ft.

Gaudryina rugosa d'Orb.
694, 726, 730, 997, 1060, 1240, 1320 ft.

Gaudryina bradyi Cushm.
1525, 1608 ft.

Gaudryina filiformis Berth.
746 ft.

Gaudryina siphonella Rss.
938 ft.

Genus CLAVULINA d'Orbigny.

Clavulina communis d'Orb.
938, 976, 990, 995, 1025, 1034, 1088, 1180, 1318, 1320, 1333, 1360, 1376, 1410, 1461, 1470, 1560, 1580, 1608 ft.

Clavulina angularis d'Orb.
1088, 1680, 1693 ft.

Clavulina parisiensis d'Orb. var. *multicamerata* Chapm.
585 ft.

Clavulina textularioidea Goës.
605, 640, 730 ft.

Clavulina cylindrica Hantk. sp.
1150, 1158, 1170, 1180, 1200, 1204, 1215 ft.

Clavulina antipodum Stache.
995 ft.

Genus **BULIMINA** d'Orbigny.

Bulimina buchiana d'Orb.
1160 ft.

Bulimina contraria Rss. sp.
1525 ft.

Genus **BOLIVINA** d'Orbigny.

Bolivina textilarioides Rss.
741, 997, 1025, 1050, 1060, 1088 ft.

Bolivina punctata d'Orb.
654, 726, 786, 850, 997, 1088 ft.

Bolivina aenariensis Costa sp.
850, 1090 ft.

Bolivina nobilis Hantk.
976, 990, 995 ft.

Genus **CASSIDULINA** d'Orbigny.

Cassidulina subglobosa Brady.
684, 741 ft.

Genus **PLEUROSTOMELLA** Reuss.

Pleurostomella subnodosa Rss.
605 ft.

Fam. Lagenidae.

Genus **LAGENA** Walker and Boys.

Lagena elongata Ehr. sp.
741 ft.

Lagena distoma P. & J.
605 ft.

Lagena gracillima Seg. sp.
640 ft.

Lagena globosa Montf. sp.
1088, 1090, 1107 ft.

Lagena striata d'Orb.
585 ft.

Lagena sulcata W. & J. sp.
476, 1060 ft.

Lagena squamosa Mont. sp.
690 ft.

Lagena hexagona Williamson sp.
623 ft.

Lagena aspera Rss.
674, 1160 ft.

Lagena hispida Rss.
660, 726 ft.

Lagena quadricostata Rss.
997 ft.

Lagena favosopunctata Brady.
995, 1025 ft.

Lagena schlichti A. Silv. sp.
1025, 1088 ft.

Lagena laevigata Rss. sp.
990, 995, 997 ft.

Lagena orbignyana Seg. sp.
990, 995, 997, 1025, 1034, 1446, 1461, 1525 ft.

Lagena marginata W. & B. sp.
976 ft.

Genus **NODOSARIA** Lamarck.

Sub-genus **GLANDULINA** d'Orb.

Nodosaria (*Gl.*) *laevigata* Rss.
690, 758, 1025, 1034, 1070, 1138, 1286, 1470, 1680 ft.

Sub-genus **DENTALINA** d'Orb.

Nodosaria (*D.*) *communis* d'Orb.
990, 1090 ft.

Nodosaria (*D.*) *consobrina* d'Orb.
746, 1034 ft.

Nodosaria (*D.*) *consobrina* var. *emaciata* Rss.
640 ft.

Nodosaria (*D.*) *inflexa* Rss.
1200 ft.

Nodosaria (*D.*) *plebeia* Rss.
1060 ft.

Nodosaria (*D.*) *pyrula* d'Orb.
997 ft.

Nodosaria (*D.*) *soluta* Rss.
694, 730, 902, 938, 1025, 1050, 1088, 1160, 1164, 1170, 1180, 1191, 1200, 1240, 1259, 1286, 1310, 1318, 1333, 1400, 1410, 1461, 1470, 1549, 1580, 1658, 1680 ft.

Nodosaria (*D.*) *retrorsa* Rss. sp.
995 ft.

Nodosaria (*D*) *multilineata* Born. sp.
1295, 1680 ft.

Nodosaria (*D.*) *obliqua* L. sp.
630, 741, 850, 902, 976, 1034, 1050, 1150, 1215, 1220, 1232, 1295, 1400, 1470, 1490, 1615, 1667 ft.

(Nodosaria sensu stricto.)

Nodosaria raphanus L. sp.
995, 1461, 1608 ft.

Nodosaria badenensis d'Orb.
605 ft.

Nodosaria affinis d'Orb.
1333 ft.

Nodosaria aff. *costulata* Rss.
1333 ft.

Genus **FRONDICULARIA** Defrance.

Frondicularia inaequalis Costa.
997 ft.

Frondicularia nuda, Chapm. & Cresp.
1088 ft.

Genus MARGINULINA d'Orbigny.

Marginulina glabra d'Orb.
1088, 1090 ft.

Marginulina costata Batsch sp.
1461, 1525 ft.

Genus VAGINULINA d'Orbigny.

Vaginulina patens Br.
476 ft.

Genus CRISTELLARIA Lamarck.

Cristellaria rotulata Lam. sp.
730, 1107, 1150, 1200, 1259, 1465, 1560 ft.

Cristellaria vortex d'Orb.
1446 ft.

Cristellaria orbicularis d'Orb. sp.
990, 1470 ft.

Cristellaria cultrata Montf. sp.
640, 758, 850, 990, 997, 1025, 1160, 1295, 1330, 1333, 1340, 1608, 1667, 1693 ft.

Cristellaria subalata Brady.
1667 ft.

Cristellaria articulata Rss. sp.
938, 976, 1034, 1088, 1340, 1525, 1560, 1680 ft.

Cristellaria gibba d'Orb.
990, 1025, 1050 ft.

Cristellaria reniformis d'Orb.
1410, 1549 ft.

Cristellaria elongata d'Orb.
1667 ft.

Genus FLABELLINA d'Orbigny.

Flabellina rugosa d'Orb.
1240 ft.

Genus POLYMORPHINA d'Orbigny.

Polymorphina lactea W. & J. sp.
67, 598, 997 ft.

Polymorphina communis d'Orb.
598, 730 ft.

Polymorphina compressa d'Orb.
694, 730 ft.

Polymorphina elegantissima P. & J.
585, 605, 670, 694, 1560 ft.

Polymorphina oblonga d'Orb.
(?) 397, 719 ft.

Polymorphina rotundata Börn. sp.
730 ft.

Polymorphina sororia Rss.
1180 ft.

Polymorphina regina B. P. & J.
694 ft.

Genus **UVIGERINA** d'Orbigny.

Uvigerina pygmaea d'Orb.
605, 741 ft.

Uvigerina tenuistriata Rss.
730 ft.

Fam. Globigerinidae.

Genus **GLOBIGERINA** d'Orbigny.

Globigerina bulloides d'Orb.
67, 585, 605, 630, 670, 997, 1025, 1310, 1360, 1525, 1560, 1680, 1693 ft.

Globigerina triloba Rss.
758, 938, 1060, 1360, 1470, 1509, 1525, 1549, 1560, 1680 ft.

Globigerina inflata d'Orb.
1333 ft.

Genus **ORBULINA** d'Orbigny.

Orbulina universa d'Orb.
630, 730, 758, 800, 826 (not typical), 850, 902, 938, 976, 995, 1025, 1034, 1060, 1088, 1090, 1191, 1318, 1333, 1360, 1410, 1446, 1470, 1525 ft.

Genus **PULLENIA** Parker and Jones.

Pullenia quinqueloba Rss. sp.
623, 997 ft.

Genus **SPHAEROIDINA** d'Orbigny.

Sphaeroidina bulloides d'Orb.
605, 640, 694, 726, 730, 758, 826, 902, 938, 976, 990, 1025, 1034, 1050, 1060, 1088, 1461, 1560 ft.

Fam. Rotaliidae.

Genus **SPIRILLINA** Ehrenberg.

Spirillina inaequalis Brady sp.
1680 ft.

Genus **DISCORBINA** Parker and Jones.

Discorbina araucana d'Orb. sp.
726 ft.

Discorbina vilardeboana d'Orb. sp.
623 ft.

Discorbina bertheloti d'Orb. sp.
623, 670, 690, 694, 741, 746, 786 ft.

Discorbina rugosa d'Orb. sp.
623, 826 ft.

Discorbina visicularis d'Orb. sp.
746, 758 ft.

Discorbina dimidiata P. & J.
719 ft.

Discorbina globularis d'Orb. sp.
324, 690 ft.

Discorbina orbicularis d'Orb. sp.
476 ft.

Discorbina parisiensis d'Orb. sp.
640 ft.

Discorbina pileolus d'Orb sp.
660 ft.

Discorbina rosacea d'Orb. sp.
476 ft.

Discorbina turbo d'Orb. sp.
674 ft.

Discorbina obtusa d'Orb sp.
585, 1461 ft.

Genus **TRUNCATULINA** d'Orbigny.

Truncatulina lobatula W. & J. sp.
67, 460, 476, 605, 630, 640, 684, 741, 758, 902, 1088, 1693 ft.

Truncatulina refulgens Montf. sp.
476, 585, 618 ft.

Truncatulina wuellerstorfi Sch. sp.
630, 1025, 1034, 1050, 1060, 1088, 1090 ft.

Truncatulina ungeriana d'Orb. sp.
67, 585, 598, 605, 618, 623, 640, 654, 660, 661, 670, 674, 684, 690, 694, 719, 730, 741, 746, 758, 786, 800, 826, 850, 902, 938, 976, 990, 995, 997, 1034, 1060, 1070, 1090, 1107, 1138, 1160, 1164 1170, 1180, 1259, 1286, 1295, 1310, 1320, 1330, 1333, 1360, 1461, 1465, 1509, 1525, 1549, 1560, 1608, 1640, 1658, 1680, 1693 ft.

Truncatulina akneriana d'Orb. sp.
623, 640, 654, 661, 670, 976, 1090, 1360, 1525 ft.

Truncatulina margaritifera Brady.
1295 ft.

Truncatulina mundula B.P. & J.
585, 623, 630, 654, 660, 661, 670, 674, 690, 694, 719, 726, 730, 741, 746, 786, 800, 902, 938, 976, 995, 997, 1025, 1034, 1050, 1088, 1090, 1107, 1138, 1164, 1240, 1259, 1286, 1295, 1310, 1318, 1330, 1360, 1410, 1426, 1446, 1461, 1470, 1560, 1640, 1680, 1693 ft.

Truncatulina mundula B.P. & J. var. *carinata,* nov.
938, 990, 995, 1050, 1060, 1088, 1107, 1164, 1240, 1286, 1465, 1470 ft.

Genus **SIPHONINA** Reuss.

Siphonina reticulata Cz. sp.
589, 1070, 1160, 1310, 1525 ft.

Genus **ANOMALINA** Parker and Jones.

Anomalina ammonoides Rss. sp.
324, 605, 618, 684, 690, 726, 758, 826, 902, 938, 976, 990, 997, 1025, 1034, 1060, 1088, 1107, 1138, 1259, 1376, 1470, 1640, 1680 ft.

Anomalina polymorpha Costa.
730 ft.

Genus **PULVINULINA** Parker and Jones.

Pulvinulina elegans d'Orb. sp.
324, 343, 445, 585, 598, 661, 726, 976, 1060, 1310, 1318, 1640, 1667 ft.
Pulvinulina auricula F. & M. sp.
684, 997, 1088, 1286, 1560, 1580 ft.
Pulvinulina exigua Brady.
1025 ft.
Pulvinulina karsteni Rss. sp.
640 ft.
Pulvinulina repanda F. & M. sp.
623 ft.
Pulvinulina hauerii d'Orb. sp.
605, 1295, 1340, 1360, 1608 ft.
Pulvinulina punctulata d'Orb. sp.
630 ft.
Pulvinulina scabricula Chapm.
990 ft.
Pulvinulina schreibersii d'Orb.
674 ft.

Genus **ROTALIA** Lamarck.

Rotalia beccarii L. sp.
343, 476, 489, 585, 623 ft.
Rotalia clathrata Brady.
598, 605, 618, 623, 654, 660, 661, 670, 741, 786, 850, 1025, 1034, 1060, 1088, 1107 ft.
Rotalia orbicularis d'Orb.
1400 ft.
Rotalia soldanii d'Orb.
585, 1400, 1470 ft.

Genus **CALCARINA** d'Orbigny.

Calcarina defrancii d'Orb.
1138 ft.

Fam. NUMMULINIDAE.

Genus **NONIONINA** d'Orbigny.

Nonionina depressula W. & J. sp.
598, 674, 850, 1138 ft.
Nonionina boueana d'Orb.
623, 660 ft.
Nonionina scapha F. & M. sp.
598, 850 ft.
Nonionina umbilicata Montf. sp.
1070, 1107 ft.
Nonionina pompilioides F. & M. sp.
1640, 1667 ft.
Nonionina turgida Will. sp.
850 ft.

Genus **POLYSTOMELLA** Lamarck.

Polystomella striatopunctata F. & M. sp.
489 ft.
Polystomella striatopunctata F. & M. sp. var. *evoluta* Chapm.
623 ft.
Polystomella crispa L. sp.
67, 476, 585, 598, 618, 623, 670, 674, 719 ft.
Polystomella subnodosa Münster sp.
476, 585, 640 ft.
Polystomella craticulata F. & M. sp.
1060 ft.
Polystomella macella F. & M. sp.
476, 585, 630, 1295, 1320 ft.

Genus **OPERCULINA** d'Orbigny.

Operculina complanata Defr. sp.
1240 ft.

Phylum COELENTERATA.

Class ANTHOZOA.

Sub-class HEXACORALLA.

Fam. TURBINOLIIDAE.

Genus **SPHENOTROCHUS** Edwards and Haime.

Sphenotrochus emarciatus Dunc.
623, 670, 664, 1158, 1204, 1340 ft.
Sphenotrochus alatus T.W.
630, 654, 990, 1060, 1560 ft.

Genus **DELTOCYATHUS** Edwards and Haime.

Deltocyathus verconis Denn.
605, 630, 719 ft.

Genus **FLABELLUM** Lesson.

Flabellum curtum Denn.
605 ft.
Flabellum gambierense Dunc.
1310 ft.
Flabellum gippslandicum Denn.
719 ft.
Flabellum victoriae Dunc.
719, (?)726, 1180, 1230, 1286 ft.

Genus **PLACOTROCHUS** Edwards and Haime.

Placotrochus deltoideus Dunc.
670, 674, 719, 938 ft.
Placotrochus elongatus Dunc.
1240 ft.

Fam. ASTRAEIDAE.

Genus **CONOSMILIA** Duncan.

Conosmilia striata Dunc.
1215, 1320, 1461 ft.

Genus **PARASMILIA** Edwards and Haime.

Parasmilia lucens Denn. (Plesiotype).
902 ft.

Fam. FUNGIIDAE.

Genus BATHYACTIS Moseley.

Bathyactis lens Duncan sp.
605, 730, 1180, 1191, 1215, 1310, 1376, 1580 ft.
Bathyactis beaumariensis Denn.
605, 623, 660, 670, 674, 741 ft.

Fam. EUPSAMMIIDAE.

Genus TREMATOTROCHUS T. Woods.

Trematotrochus fenestratus T.W.
654, 660, 995, 1034, 1050, 1060, 1158, 1215, 1240, 1461, 1667 ft.

Genus NOTOPHYLLIA Dennant.

Notophyllia variolaris T.W. sp.
(?)605, 623, 654, 670, 674, 719, 1180, 1286 ft.
Notophyllia gracilis Denn.
850, 990, 1204, 1465, 1658, 1667 ft.

Sub-class OCTOCORALLA.

Fam. PENNATULIDAE.

Genus GRAPHULARIA Edwards and Haime.

Graphularia kalimnae Chapm. & Cresp.
605, 661, 674 ft.

Fam. GORGONIIDAE.

Genus MOPSEA Lamaroux.

Mopsea hamiltoni Thomson sp.
990, 997 ft.
Mopsea tenisoni Chapm.
850, 1215, 1240, 1318 ft.
Mopsea, sp. indet.
623, 630, 1150, 1200, 1580 ft.
Ceratosoid alcyonarian, spicule of.
605 ft.

Phylum VERMES.

Class CHAETOPODA.

Order TUBICOLA.

Genus SERPULA Linné.

Serpula sp.
1608, 1615 ft.

Genus DITRUPA Berkley.

Ditrupa cornea L. sp. var. *wormbetiensis* McCoy.
640, 670, 674, 719, 726, 730, 746, 1090, 1180 ft.
Ditrupa cf. *cornea* L. (var. indet.).
630 ft.

Phylum ECHINODERMATA.

Order PHANEROZONIA.

Fam. Goniasteridae.

Genus PENTAGONASTER Gray.

Pentagonaster, sp. indet.
623, 630, 660, 670 ft.

Class ECHINOIDEA.

Order CIDAROIDA.

Fam. Cidaridae.

Genus GONIOCIDARIS Desor.

Goniocidaris prunispinosa Chapm. & Cudm. (plates and spines).
995, 1034, 1310, 1340, 1376, 1490, 1580, 1667 feet.
Goniocidaris pentaspinosa Chapm. & Cudm. (plates and spines).
1330 ft.
cf. *Goniocidaris* sp.
1060 ft.
Cidaroid spines, indet.
654, 1295, 1310, 1465 ft.

Order EXOCYCLOIDA.

Fam. Fibulariidae.

Genus ECHINOCYAMUS Leske.

Sub-genus SCUTELLINA Agassiz.

Echinocyamus (*Scutellina*) *patella* Tate sp.
1158 ft.
Echinoid spines, indet.
598, 630, 990, 997, 1191, 1215, 1220, 1240, 1286, 1318, 1320, 1333, 1360, 1410, 1461, 1470, 1608, 1640, 1658, 1693 ft.
Echinoid test-fragments, indet.
585, 1615 ft.

Phylum MOLLUSCOIDEA.

Class POLYZOA.

Order CYCLOSTOMATA.

Fam. Crisiidae.

Genus CRISIA Lamaroux.

Crisia scalaris MacG.
1160, 1615 ft.
Crisia sp.
397 ft.

Fam. Idmoneidae.

Genus IDMONEA Lamaroux.

Idmonea hochstetteriana Stol. sp.
902, 1107 ft.

Fam. HORNERIDAE.

Hornera foliacea MacG.
1164 ft.

Hornera frondiculata MacG.
1658 ft.

Hornera prominens MacG.
1658 ft.

Order CHEILOSTOMATA.

Fam. CELLULARIIDAE.

Genus CABEREA Lamaroux.

Caberea grandis Hincks.
726 ft.

Fam. CELLARIIDAE.

Genus CELLARIA Lamaroux.

Cellaria australis MacG.
324, 605, 623, 654, 660, 674, 719, 902, 938, 976, 995, 1107, 1158, 1191, 1204, 1240, 1509, 1608 ft.

Cellaria contigua MacG.
640, 654, 660, 976, 997, 1164, 1204, 1220, 1310, 1340, 1376, 1608 ft.

Cellaria rigida MacG.
623, 719, 902, 1240, 1580 ft.

Cellaria rigida MacG. var. *perampla* Waters.
630, 640, 660, 719, 1034, 1608, 1615, 1693 ft.

Cellaria rigida var. *venusta* MacG.
1034, 1232, 1295 ft.

Cellaria, sp. indet.
1107 ft.

Genus MELICERITA M. Edwards.

Melicerita sorrentae Chapm. & Cresp.
1360 ft.

Melicerita acutimarginata MacG.
605, 654, 660, 670, 719, 730, 1150, 1180, 1204 ft.

Melicerita angustiloba Busk sp.
630, 1170, 1180, 1191, 1204, 1215, 1220, 1230, 1232, 1240, 1490 ft.

Fam. MEMBRANIPORIDAE.

Genus MEMBRANIPORA Blainville.

Membranipora striata McG.
1230 ft.

Genus AMPHIBLESTRUM Gray.

Amphiblestrum argus d'Orb. sp.
1259, 1333 ft.

Amphiblestrum ctenostoma Chapm. & Cresp.
1025 ft.

Amphiblestrum regularis Maplestone sp.
1376 ft.

Amphiblestrum spathuloides Chapm. & Cresp.
1658, 1693 ft.

Genus LUNULITES Lamarck.

Lunulites canaliculata MacG.
605, 623, 630, 670, 694, 719, 730, 976, 1034, 1180, 1230, 1240 ft.

Lunulites parvicella T. W. sp.
1200 ft.

Lunulites rutella T. W. sp.
623, 670, 674, 1050, 1060, 1088, 1215, 1461, 1525, 1549, 1560 ft.

Genus SELENARIA Busk.

Selenaria concinna T. W.
605, 1060, 1070, 1090, 1138, 1158, 1164, 1191, 1204, 1215, 1560 ft.

Selenaria cupola T. W. sp.
605, 618, 623, 630, 640, 694, 741, 800 ft.

Selenaria maculata Busk.
660, 661, 730, 741, 1170, 1180, 1230, 1525 ft.

Selenaria marginata T. W.
585, 605, 618, 630, 604, 660, 670, 674, 694, 719, 730, 741, 976, 995, 1025, 1050, 1107, 1164, 1191, 1215, 1240, 1410, 1426, 1461, 1490, 1525, 1560 ft.

Selenaria marginata T. W. var. *lucens* MacG.
630, 674, 694, 938, 1088, 1170 ft.

Selenaria marginata T. W. var. *pulchella* MacG.
605, 623 ft.

Selenaria marginata T. W. var. *spiralis* Chapm.
630 ft.

Selenaria sp.
598 ft.

Fam. Steganoporellidae.

Genus STEGANOPORELLA Smitt.

Steganoporella magnilabris Busk sp.
1693 ft.

Fam. Cribrilinidae.

Genus CRIBRILINA Gray.

Cribrilina terminata Waters.
1320 ft.

Cribrilina elevata MacG.
1107, 1204, 1232 ft.

Fam. Hiantoporidae.

Genus HIANTOPORA MacGillivray.

Hiantopora halli MacG.
1180 ft.

Fam. Microporellidae.

Genus TESSARADOMA Norman.

Tessaradoma elevata Waters sp.
995 ft.

Genus **ADEONA** Lamaroux.

Adeona clavata MacG.
1525 ft.

Adeona grisea MacG.
1259, 1667 ft.

Adeona mucronata MacG.
1220 ft.

Adeona obliqua MacG.
995, 997, 1025, 1034, 1164, 1180, 1191, 1204, 1215, 1220, 1230, 1232, 1240, 1259, 1286, 1295, 1310, 1318, 1320, 1330, 1340, 1360, 1376, 1400, 1461, 1470, 1490, 1580, 1608, 1658 ft.

Adeona symmetrica MacG.
1320, 1680 ft.

Adeona sp. (anchoring tubes).
1240 ft.

Fam. Lepraliidae.

Genus **LEPRALIA** Johnston.

Lepralia graysoni MacG.
1295 ft.

Fam. Schizoporellidae.

Genus **SCHIZOPORELLA** Hincks.

Schizoporella rugosa MacG.
758 ft.

Schizoporella submersa Waters.
1658 ft.

Genus **HASWELLIA** Busk.

Haswellia producta MacG.
1107 ft.

Genus **BIPORA** Whitelegge.

Bipora cancellata Busk sp.
694, 1107, 1191, 1220 ft.

Bipora philippinensis Busk sp.
605, 630, 640, 719, 938, 1050, 1060, 1107, 1138, 1160, 1170, 1191, 1204, 1410, 1615 ft.

Fam. Smittinidae.

Genus **SMITTINA** Norman.

Smittina cf. *modesta* MacG. sp.
618 ft.

Genus **CUCULLIPORA** MacGillivray.

Cucullipora tetrasticha MacG.
1426 ft.

Genus **ACROPORA** Reuss.

Acropora gracilis M. Edw. sp.
902, 1034, 1088, 1107, 1191, 1204, 1220, 1230, 1310, 1426, 1465, 1470, 1490, 1509, 1615 ft.

Acropora gracilis M. Edw. sp. var. *vertebralis* Stol.
1286 ft.

Fam. BITECTIPORIDAE.

Genus BITECTIPORA MacGillivray.

Bitectipora lineata MacG.
1615 ft.

Fam. CELLEPORIDAE.

Genus LEKYTHOPORA MacGillivray.

Lekythopora hystrix MacG.
640 ft.

Genus CELLEPORA Fabricius.

Cellepora fossa Hasw. sp.
605, 990, 995, 1034, 1107, 1164, 1180, 1204, 1215, 1220, 1232, 1240, 1310, 1426, 1490, 1615 ft.
Cellepora tridenticulata var. *nummularia* Busk.
1164, 1204 ft.
Cellepora stellata Maplestone.
1204, 1400 ft.
Cellepora sp. indet.
902 ft.

Fam. RETEPORIDAE.

Genus RETEPORA Imperato.

Retepora aciculifera MacG.
1034 ft.
Retepora beaniana King.
976, 995, 1215, 1230 ft.
Retepora corioensis MacG.
1509 ft.
Retepora fissa MacG.
1461 ft.
Retepora lineata MacG.
660, 990 ft.

Class BRACHIOPODA.

Order TELOTREMATA.

Fam. DIMERELLIDAE.

Genus CRYPTOPORA Jeffreys.

Cryptopora acutirostra Chapm. sp.
660 ft.

Fam. TEREBRATULIDAE.

Genus TEREBRATULA Müller.

Terebratula tateana T. W.
1164 ft.
Terebratula aldingae Tate.
654 ft.

Genus MURRAVIA J. Allan Thomson.

Murravia catinuliformis Tate sp.
618, 670, 674, 719, 730 ft.
Murravia flindersi Chapm. sp.
990 ft.

Fam. TEREBRATELLIDAE.

Genus MALLEIA J. Allan Thomson.

? *Malleia planidorsata* Chapm. & Cresp.
618, 623 ft.

Genus **MAGADINA** J. Allan Thomson.

Magadina compta Sow. sp.
585, 605, 674 ft.

Genus **MAGADINELLA** J. Allan Thomson.

Magadinella woodsiana Tate sp.
605, 660 ft.

Phylum MOLLUSCA.

Class PELECYPODA.

Order **PRIONODESMACEA.**

Fam. NUCULIDAE.

Genus **NUCULA** Lamarck.

Nucula obliqua Lam.
670, 768, 1034 (juv), 1158, 1259, 1615, 1680 ft.

Nucula semistriata Tate.
694, 1295 ft.

Nucula fenestralis Tate.
660 ft.

Nucula morundiana Tate.
630, 719, 1608, 1615 ft.

Fam. NUCULANIDAE.

Genus **NUCULANA** Link.

Nuculana acinaciformis Tate sp.
598 ft.

Nuculana woodsi Tate sp.
605, 618, 623, 660, 670, 694, 719, 730, 1090, 1138, 1158, 1310, 1318, 1320, 1330 ft.

Nuculana crebrecostata T. W. sp.
623, 660, 670, 719, 741, 938, 995, 1070 ft.

Nuculana vagans Tate sp.
605, 670, 694, 1034, 1050, 1230, 1295, 1320, 1330 ft.

Nuculana chapmani Finlay.
605, 618, 630, 640, 654, 690, 1050, 1107, 1200 ft.

Nuculana praelonga Tate.
605, 640 ft.

Nuculana fortis Hedley sp.
1107 ft.

Nuculana fontinalis Pritch. sp.
630, 758, 1310, 1360 ft.

Nuculana miliacea Hedley sp.
618, 630, 674, 694, 730, 1295, 1310, 1318, 1360, 1615 ft.

Nuculana acuticauda Pritch. sp.
630, 694, 902, 1310, 1580 ft.

Genus **PROPELEDA** Iredale.

Propeleda ensicula Angas sp.
605 ft.

Propeleda huttoni T. W. sp.
694, 1107, 1158 ft.

Genus SAREPTA A. Adams.

Sarepta obolella Tate sp.
670, 902, 1164 ft.

Sarepta planiuscula Tate sp.
1107 ft.

Fam. Parallelodontidae.

Genus CUCULLAEA Lamarck.

Cucullaea corioensis McCoy.
1232 ft.

Fam. Limopsidae.

Genus LIMOPSIS Sasso.

Limopsis maccoyi Chapm.
640 (juv.), 741, 850, 902, 938, 976, 990, 995, 1025, 1034, 1090, 1107, 1191, 1200, 1204, 1215, 1240, 1259, 1330, 1400, 1490 ft.

Limopsis morningtonensis Pritch.
623 ft.

Limopsis beaumariensis Chapm.
585, 598, 605, 618, 623, 630, 660, 661, 670, 674, 694, 700 ft.

Limopsis affinitalis Chapm. & Cresp.
719, 741 ft.

Limopsis insolita Sow. sp.
730 ft.

Fam. Arcidae.

Genus ARCA Lamarck.

Sub-genus BARBATIA Gray.

Arca (Barbatia) celleporacea Tate sp.
1220 (juv.), 1295 ft.

Arca (Barbatia) crustata Tate sp.
995, 1320, 1376 ft.

Arca (Barbatia) dissimulina Chapm. & Cresp.
670, 674 ft.

Arca (Barbatia) microïndula Chapm. & Cresp.
618, 623, 660 ft.

Sub-genus PLAGIARCA Conrad.

Arca (Plagiarca) cainozoica Tate.
1259 ft.

Genus LISSARCA E. A. Smith.

Lissarca rubricata Tate sp.
605, 640, 660, 670, 902, 1138, 1220, 1230, 1232 ft.

Lissarca cincturata Chapm. & Cresp.
1107 ft.

Genus GLYCYMERIS Da Costa.

Glycymeris striatularis Lam. sp.
585 ft.

Glycymeris halli Pritch.
618, 623, 660 ft.

Glycymeris planiuscula Chapm. & Singl. sp.
623, 674 ft.

Glycymeris convexus Tate sp.
605, 730 ft.

Glycymeris gunyoungensis Chapm. & Singl.
902, 1107, 1138, 1158, 1164, 1191, 1204, 1320 ft.

Fam. Pinnidae.

Genus PINNA Linné.

Pinna sp. indet.
826, 997 ft.

Fam. Pteriidae.

Genus PINCTADA Bolten.

Pinctada crassicardia Tate sp.
1615 ft.

Genus PHILOBRYA Carpenter.

Philobrya bernardi Tate.
1107 ft.

Fam. Ostreidae.

Genus OSTREA Linné.

Ostrea sp.
408, 445, 1360 ft.

Fam. Trigoniidae.

Genus TRIGONIA Bruguière.

Trigonia tubulifera Tate.
1158, 1232 ft.

Genus NEOTRIGONIA Cossmann.

Neotrigonia acuticostata McCoy sp.
605, 654, 670, 902 ft.

Neotrigonia lamarcki Gray sp.
640, 719 ft.

Fam. PECTINIDAE.

Genus **CHLAMYS** Bolten.

Chlamys antiaustralis Tate sp.
630, 660, 661, 674, 694 ft.

Chlamys cf. *keiloriana* Cresp.
758 ft.

Chlamys sturtiana Tate sp.
654, 758 (cast) ft.

Chlamys foulcheri T. W. sp.
618, 1360 ft.

Chlamys murrayanus Tate sp.
1320 ft.

Genus **PSEUDAMUSSIUM** Adams.

Pseudamussium yahliensis T. W. sp.
902, 1090 ft.

Genus **PROPEAMUSIUM** Gregorio.

Propeamusium atkinsoni Johnst. sp.
1220, 1230 ft.

Fam. SPONDYLIDAE.

Genus **SPONDYLUS** Linné.

Spondylus pseudoradula McCoy.
618, 670 (juv.), 1090, 1191 ft.

Fam. DIMYIDAE.

Genus **DIMYA** Rouault.

Dimya dissimilis Tate.
654, 684, 700, 990, 1050, 1090, 1158, 1160, 1164, 1232, 1240, 1259, 1310, 1320, 1608 ft.

Fam. LIMIDAE.

Genus **LIMA** Bruguière.

Lima bassi T. W.
1107 ft.

Lima, sp. indet.
1615 (juv.) ft.

Sub-genus **LIMATULA** Wood.

Lima (*Limatula*) *jeffreysiana* Tate sp.
623 ft.

Genus **LIMAEA** Bronn.

Limaea transenna Tate.
660 ft.

Fam. ANOMIIDAE.

Genus ANOMIA Müller.

Anomia tatei Chapm. & Singl.
605, 670, 694 ft.

cf. *Anomia* sp. (juv.).
1295, 1615 ft.

Fam. MYTILIDAE.

Genus MODIOLUS Lamarck.

Modiolus lineus Hedley sp.
741 ft.

Genus CRENELLA Brown.

Crenella globularis Tate.
1107 ft.

Order ANOMALODESMACEA.

Fam. MYOCHAMIDAE.

Genus MYODORA Gray.

Myodora gabrieli Chapm. & Cresp.
694, 719, 730, 741 ft.

Myodora tenuilirata Tate.
630 ft.

Myodora, sp. indet.
605 ft.

Fam. CUSPIDARIDAE.

Genus CUSPIDARIA Nardo.

Cuspidaria vellicata Chapm. & Cresp.
605 ft.

Order TELEODESMACEA.

Fam. CRASSATELLITIDAE.

Genus CRASSATELLITES Kruger.

Crassatellites abbreviata Tate sp.
694 ft.

Crassatellites communis Chapm. & Cresp.
623, 670, 741, 1088, 1090 ft.

Genus CUNA Hedley.

Cuna multilamella Tate sp.
1107, 1150, 1191 ft.

Cuna sp.
660 ft.

Cuna polita Tate sp.
585, 630, 1034 ft.

Cuna lamellata Tate sp.
1160 ft.

Fam. CARDITIDAE.

Genus CARDITA Bruguière.

Cardita sorrentae Chapm. & Cresp.
623, 719 ft.

Genus VENERICARDIA Lamarck.

Venericardia calva Tate sp.
585, 605, 618, 623, 630, 640, 654, 660, 670, 674, 690, 694, 719, 730, 758, 850, 1150 ft.

Venericardia scabrosa Tate.
719, 976, 1107, 1191, 1330, 1340 ft.

Venericardia archaenepeanensis Chapm. & Cresp.
674 ft.

Venericardia cf. *trigonalis* Tate sp.
786 ft.

Venericardia compacta Tate sp.
719, 902, 1107, 1164, 1170, 1180, 1191, 1204, 1215, 1220, 1240, 1470, 1615 ft.

Venericardia trigonalis Tate sp.
670 ft.

Venericardia delicatula Tate sp.
618, 670, 674, 1088, 1204, 1608 ft.

Venericardia gracilicostata T. W. sp.
1025, 1050 (juv.), 1160, 1180, 1215, 1259, 1376, 1400 ft.

Venericardia pecten Tate sp.
623, 730, 741 ft.

Venericardia subcompacta Chapm. & Cresp.
605, 618, 661, 694, 730, 741 ft.

Venericardia latissima Tate sp.
758, 990 ft.

Venericardia solida Tate sp.
618, 726, 730 ft.

Venericardia spinulosa Tate sp.
605, 618, 623, 630, 640, 654, 660, 674, 694, 730, 850, 902, 1107, 1138, 1490 ft.

Fam. CONDYLOCARDIIDAE.

Genus CONDYLOCARDIA Bernard.

Condylocardia tenuicostae Chapm. & Gabr.
746 ft.

Fam. LUCINIDAE.

Genus LUCINA Bruguière.

Lucina affinis Tate.
585, 605 ft.

Lucina araea Tate.
730, 741 ft.

Lucina leucomomorpha Tate.
660 ft.
Lucina nuciformis Tate.
605, 618, 661, 741 ft.
Lucina projecta Tate.
1158 ft.

Fam. LEPTONIDAE.

Genus ERYCINA (Lam.) Fischer.

Erycina micans Tate sp.
605, 630, 660 ft.

Genus MONTACUTA Montagu.

Montacuta sericea Tate sp.
585, 741, 1158 ft.

Genus NEOLEPTON Monterosato.

Neolepton novacambricum Hedley.
1160 ft.

Fam. CARDIIDAE.

Genus CARDIUM Linné.

Cardium hemimeris Tate.
1138 ft.

Genus PROTOCARDIA Beyrich.

Protocardium ornithopetronica Chapm. & Cresp.
1070 ft.

Genus LEPTON Turton.

Lepton crassum Tate.
1025, 1180 ft.

Fam. VENERIDAE.

Genus DOSINIA Scopoli.

Dosinia cf. *coerulea* Reeve.
585 ft.
Dosinia johnstoni Tate.
605 ft.

Genus KATELYSIA Römer.

Katelysia strigosa Lam. sp.
674 ft.
Katelysia multistrigosa Chapm. & Cresp.
605, 730 ft.

Genus ANTIGONA Schumacher.

Antigona dennanti Chapm. & Cresp.
618, 623, 660, 674, 694 ft.
Antigona dimorphophylla Tate sp.
741 (juv.) ft.
Antigona cognata Pritch sp.
585, 605 ft.

Genus CLAUSINELLA Gray.

Clausinella shelfordensis Chapm. & Cresp.
1615 ft.

Clausinella subroborata Tate sp.
605, 618, 660, 670, 719 ft.

Genus MACROCALLISTA Meek.

Macrocallista submultistriata Tate sp.
605, 1158 ft.

Genus BASSINA Jukes-Brown.

Bassina paucirugata Tate sp.
598 ft.

Genus CALLANAITIS Iredale.

Callanaitis cainozoica T. W. sp.
661, 1286 ft.

Fam. Semelidae.

Genus SEMELE Schumacher.

Semele krausei McCoy sp.
741, 902 ft.

Fam. Donacidae.

Genus DONAX Linné.

Donax dixoni Tate.
585 ft.

Fam. Mactridae.

Genus MACTRA Linné.

Mactra axiniformis Tate.
598 ft.

Genus SPISULA Gray.

Spisula trigonella Lamarck.
489 ft.

Genus ZENATIOPSIS Tate.

Zenatiopsis angustata Tate.
598, 670, 694 ft.

Fam. Corbulidae.

Genus CORBULA Lamarck.

Corbula ephamilla Tate.
585, 623, 730 ft.

Corbula coxi Pilsbry.
630, 719 ft.

Corbula pyxidata Tate.
605, 618, 623, 654, 661, 674, 730, 1310, 1320 ft.

Fam. SAXICAVIDAE.

Genus PANOPE Menard.

Panope cf. *orbita* Hutton.
623 ft.

Fam. PHOLADIDAE.

Genus BARNEA Leach.

Barnea sp. (fragment).
585 ft.

Class SCAPHOPODA.

Fam. DENTALIIDAE.

Genus DENTALIUM Linné.

Dentalium lacteolum Tate.
605, 623, 1204, 1232, 1259, 1320, 1333, 1615 ft.
Dentalium subfissura Tate.
618, 660, 730, 990, 995, 1107, 1220, 1310, 1330 ft.
Dentalium cf. *largicrescens* Tate.
674 ft.
Dentalium mantelli Zittel.
661, 995, 1158, 1170, 1230, 1240, 1426 ft.
Dentalium aratum Tate.
605, 623, 630, 640, 660, 661, 670, 674, 694, 730, 741, 990, 995, 1060, 1138, 1215, 1320, 1400, 1410, 1465, 1608 ft.
Dentalium semiaratum Chapm. & Cresp.
719 ft.
Dentalium latesulcatum Tate.
674 ft.
Dentalium sp. (fragment).
585, 758 ft.

Class AMPHINEURA.

Order POLYPLACOPORA.

Fam. ACANTHOCHITIDAE.

Genus ACANTHOCHITONA Gray.

Acanthochitona cf. *chapmani* Ashby.
585 ft.

Class GASTEROPODA.

Order ASPHIDOBRANCHIA.

Fam. FISSURELLIDAE.

Genus EMARGINULA Lamarck.

Emarginula transenna T. W.
1158, 1259 ft.

Fam. TURBINIDAE.

Genus LIOPYRGA Adams.

Liopyrga quadricingulata Tate.
585 ft.

Fam. Liotiidae.

Genus **LIOTINA** Fischer.

Liotina roblini T. W. (juv.).
623 ft.

Genus **LIOTELLA** Iredale.

Liotella capitata Hedley sp.
741 ft.

Genus **BROOKULA** Iredale.

Brookula singletoni Chapm. & Cresp.
1461 ft.

Fam. Trochidae.

Genus **EUTROCHUS** Adams.

Eutrochus fontinalis Pritch.
758 ft.

Genus **NOTOGIBBULA** Iredale.

Notogibbula, sp. indet.
1470 ft.

Genus **SOLARIELLA** H. & A. Adams.

Solariella strigata T. W.
670 ft.

Fam. Umboniidae.

Genus **TEINOSTOMA** H. & A. Adams.

Teinostoma calva Chapm. & Cresp.
661, 902, 1107, 1138, 1158, 1180, 1191, 1240, 1286, 1320, 1410, 1446, 1461 ft.

Genus **CYCLOSTREMA** Marryatt.

Cyclostrema cornuspira Chapm. & Cresp.
1150 ft.

Order **CTENOBRANCHIATA.**

Fam. Eulimidae.

Genus **EULIMA** Risso.

Eulima bicurvata Chapm. & Cresp.
990 ft.

Fam. Pyramidellidae.

Genus **TURBONILLA** Risso.

Turbonilla liraecostata T. W.
719 ft.

Turbonilla mulderi Chapm. & Cresp.
1465 ft.

Turbonilla radicans Chapm. & Cresp.
670, 741, 1170, 1232, 1286, 1615 ft.

Turbonilla constricta Chapm. & Cresp.
976, 1461, 1470 ft.

Turbonilla tenuissima Hedley.
1050, 1200, 1340, 1693 ft.

Genus ODOSTOMIA Fleming.

Odostomia deplexa Tate & May sp.
1549, 1560 ft.

Genus PYRAMIDELLA Adams.

Pyramidella polita Johnst.
630, 938, 1232, 1320, 1330, 1461, 1465, 1580, 1658, 1680 ft.

Pyramidella jonesiana Tate sp.
670, 694, 730, 1050, 1200, 1410 ft.

Genus SYRNOLA Adams.

Syrnola aff. *aurantiaca* Angas sp.
938 ft.

Syrnola tincta Angas sp.
1232 ft.

Genus EULIMELLA Fischer.

Eulimella nitidula Chapm. & Cresp.
1318 ft.

Genus MATHILDA Semper.

Mathilda decorata Hedley.
1025, 1170 ft.

Fam. EPITIONIIDAE.

Genus EPITONIUM Bolten.

Epitonium lampra Tate sp.
605 ft.

Epitonium gonioides Tate sp.
660 ft.

Epitonium pleiophyllum Tate sp.
640, 674 ft.

Epitonium crebrelamellatum Tate sp.
1158 ft.

Epitonium pachypleura Tate sp.
719 ft.

Genus EGLISIA Gray.

Eglisia triplicata T.W. sp.
623 ft.

Fam. LITTORINIDAE.

Genus BEMBICIUM Philippi.

(?)*Bembicium sp.*
489 ft.

Fam. SOLARIIDAE.

Genus HOMALAXIS Deshayes.

Homalaxis praemeridionalis Chapm.
995 ft.

Fam. CAPULIDAE.

Genus CALYPTRAEA Lamarck.

Calyptraea crassa Tate.
605, 719, 730 ft.

Calyptraea kalimnae Chapm. & Gabr.
630, 640, 660, 661, 670, 719 ft.

Fam. NATICIDAE.

Genus NATICA Scopoli.

Natica subnoae Tate.
1164, 1200, 1330 ft.

Natica hamiltonensis Tate.
640, 670, 990, 1461 ft.

Natica perspectiva Tate.
605, 902 ft.

Natica polita T.W.
670, 990, 1088, 1090, 1180, 1204, 1215, 1232, 1286, 1310, 1615 ft.

Natica gatliffi Chapm. & Cresp.
1107 ft.

Genus POLINICES Montfort.

Polinices substolida Tate sp.
585, 674, 694 ft.

Fam. RISSOIDAE.

Genus HAURAKIA Iredale.

Haurakia gabrieli Chapm. & Cresp.
1446 ft.

Genus RISSOINA d'Orbigny.

Rissoina lintea Hedley & May.
694, 1170, 1333, 1470 (missing), 1549 ft.

Rissoina stevensiana T.W. sp.
623, 630, 661 ft.

Genus EPIGRUS Hedley.

Epigrus variciferus T.W. sp.
730, 902, 997, 1107, 1286, 1295, 1310 ft.

Epigrus chrysalidus Chapm. & Gabr. sp.
585, 623, 674 ft.

Fam. TURRITELLIDAE.

Genus TURRITELLA Lamarck.

Turritella acricula Tate.
623, 630, 640, 661, 674, 694, 719, 758, 1088, 1090, 1150, 1180, 1191, 1200, 1204 ft.

Turritella tristira Tate.
605, 618, 623, 630, 640, 654, 660, 674, 694, 719, 730, 741, 902, 938, 976, 995, 1025, 1050, 1090, 1138, 1150, 1170, 1180, 1215, 1340, 1410, 1426, 1470, 1615, 1667 ft.

Turritella platyspira T.W.
605, 618, 623, 661, 670, 674, 730, 850, 902, 938, 976, 1025, 1034, 1050, 1107, 1138, 1164, 1170, 1215, 1259, 1330, 1470, 1667, 1680 ft.

Turritella conspicabilis Tate.
719 ft.

Turritella murrayana Tate.
623, 719, 902, 938 ft.

Turritella sturtii Tate.
623 ft.

Turritella aldingae Tate.
1400 ft.

Turritella multicincturalis Chapm. & Cresp.
623, 741 ft.

Turritella medioplicatilis Chapm. & Cresp.
1461 ft.

Turritella acinella Chapm. & Cresp.
719, 990, 1200, 1204, 1232, 1259, 1295, 1310, 1318, 1320, 1330, 1400, 1410, 1426, 1446, 1465, 1490, 1525 ft.

Fam. VERMICULARIDEA.

Genus SILIQUARIA Bruguière.

Siliquaria occlusa T.W. sp.
1164 ft.

Genus VERMICULARIA Lamarck.

Sub-genus THYLACODES Guettard.

Vermicularia (*Thylacodes*) *rudis* Tate sp.
990 ft.

Fam. CERITHIIDAE.

Genus CERITHIELLA Verrill.

Cerithiella trigemmata Chapm. & Cresp.
995, 1107, 1310, 1465, 1615 ft.

Genus BITTIUM Leach.

Bittium turritelliforme Angas sp.
623 ft.

Genus TRIFORIS Deshayes.

Triforis wilkinsoni T.W.
661, 990, 1025, 1060, 1070, 1230, 1400, 1461, 1667, 1693 ft.

Genus CERITHIOPSIS Forbes & Hanley

Cerithiopsis cribarioides T.W. sp.
902, 938, 997, 1107, 1204, 1320 ft.

Cerithiopsis reticosa Chapm. & Cresp.
1461 ft.

Cerithiopsis mitchellensis Chapm. & Cresp.
850, 1088, 1180 ft.

Genus ATAXOCERITHIUM Tate.

Ataxocerithium serotinoides Chapm. & Cresp.
1090 ft.

Fam. PYRENIDAE.

Genus PYRENE Bolten.

Pyrene cainozoica T.W. sp.
1050, 1310 ft.

Pyrene balcombensis Pritch. sp.
1050, 1204 ft.

Pyrene oxleyi T.W. sp.
1060, 1107 ft.

Pyrene woodsi Pritch. sp.
990 ft.

Fam. BUCCINIDAE.

Genus PHOS Montfort.

Phos variciferus Tate.
1204 ft.

Genus NASSARIUS Dumeril.

Nassarius crassigranosus Tate sp.
585 ft.

Nassarius (?) pauperatus Lamarck sp.
489 ft.

Nassarius spiraliscabrus Chapm. & Gabr.
990 ft.

Nassarius tatei T.W. sp.
997, 1158, 1164, 1220, 1230, 1400, 1461, 1658 ft.

Fam. MURICIDAE.

Genus MUREX Linné.

Murex polyphyllus T.W.
1050 ft.

Murex trochispira Tate.
1330 ft.

Genus TROPHON Montfort.

Trophon halli Chapm. & Cresp.
1107 ft.

Trophon profundus Chapm. & Cresp.
1107, 1170, 1158 ft.

Fam. Fusinidae.

Genus **FUSINUS** Rafinesque.

Fusinus senticosus Tate sp.
1107 ft.

Genus **FASCIOLARIA** Lamarck.

Fasciolaria rugata Tate.
1050 ft.

Genus **LATIRUS** Montfort.

Latirus semiundulatus Pritch.
1180 ft.

Genus **LEUCOZONIA** Gray.

Leucozonia micronema Tate.
1070, 1220 ft.

Fam. Marginellidae.

Genus **MARGINELLA** Lamarck.

Marginella crassidens Chapm. & Cresp.
902, 995, 1200, 1204 ft.

Marginella globiformis Chapm. & Cresp.
1060, 1070, 1138, 1215 ft.

Marginella kitsoni Chapm.
938, 990, 995, 1034, 1107, 1400 ft.

Marginella micula Tate.
902, 990, 1170, 1204, 1215, 1220, 1410, 1426, 1560 ft.

Marginella muscariodes Tate.
1050 ft.

Marginella propinqua Tate.
990, 1230 ft.

Marginella wentworthi T.W.
670, 902, 976, 990, 1034, 1050, 1060, 1107, 1158, 1164, 1170, 1180, 1191, 1204, 1215, 1461 ft.

Marginella winteri Tate.
990, 1204 ft.

Marginella woodsi Tate.
995 ft.

Fam. Mitridae.

Genus **UROMITRA** Bellardi.

Uromitra ralphii Cossm.
995, 997, 1191, 1200, 1204, 1295 ft.

Genus **CONOMITRA** Conrad.

Conomitra ligata Tate sp.
938, 1164, 1180, 1310, 1330, 1410, 1426 ft.

Conomitra othone T.W. sp.
1204 ft.

Fam. Olivellidae.

Genus **OLIVELLA** Swainson.

Olivella nymphalis Tate sp.
670 ft.

Genus **ANCILLA** Lamarck.

Ancilla orycta Tate sp.
585 ft.

Ancilla ligata Tate sp.
670, 1090, 1232, 1330, 1333 ft.

Ancilla papillata Tate sp.
585 ft.

Fam. Terebridae.

Genus **TEREBRA** Lamarck.

Terebra geniculata Tate.
585 ft.

Terebra profunda Chapm. & Gabr.
670, 719, 730 ft.

Fam. Turridae.

Genus **TURRIS** Müller.

Turris optatus Harris sp.
1164, 1180 ft.

Turris trilirata Harris.
850, 902, 1230 (juv.) ft.

Genus **ASTHENOTOMA** Harris & Burrows.

Asthenotoma consutilis T.W. sp.
902, 995 ft.

Genus **FILODRILLIA** Hedley.

Filodrillia steiroides Chapm. & Cresp.
1340 ft.

Genus **BATHYTOMA** Harris & Burrows

Bathytoma paracantha T.W. sp.
1204 ft.

Genus **BUCHOZIA** Bayan.

Buchozia columbelloides T.W. sp.
902 ft.

Buchozia hemiothone T.W. sp.
1060, 1164, 1204 ft.

Genus **INQUISITOR** Hedley.

Inquisitor integra T.W. sp.
1138, 1191, 1204, 1693 ft.

Inquisitor sandleroides T.W. sp.
990, 1164, 1204 ft.

Genus **MITRITHARA** Hedley.

Mitrithara daphnelloides T.W. sp.
1215, 1310 ft.
Mitrithara conospira Tate sp.
1490 ft.

Genus **EUCITHARA** Fischer.

Eucithara bidens T.W. sp.
902, 1164, 1200, 1615 ft.
Eucithara subglabra Chapm. & Cresp.
850 ft.

Genus **ETREMA** Hedley.

Etrema trophonalis Chapm. & Cresp.
990 ft.
Etrema praespurca Chapm. & Cresp.
1050, 1107 ft.
Etrema pseudoelegans Chapm. & Cresp.
1158 ft.

Genus **GURALEUS** Hedley.

Guraleus volutiformis Chapm. & Cresp.
1050 ft.

Fam. Conidae.

Genus **CONUS** Linné.

Conus sp. (apex.)
585 ft.

Order **OPISTHOBRANCHIA.**

Fam. Acteonidae.

Genus **SEMIACTAEON** Cossmann.

Semiactaeon microplocus Cossm.
1215 ft.

Fam. Ringiculidae.

Genus **RINGICULA** Deshayes.

Ringicula lactea Johnston.
1164, 1215, 1230 ft.
Ringicula tatei Cossm.
660, 694, 719 ft.
Ringicula tenuilirata Cossm.
605, 1025, 1158, 1204 ft.

Fam. Scaphandridae.

Genus **CYLICHNELLA** Gabb.

Cylichnella aratula Cossm. sp.
902, 1164, 1400 ft.
Cylichnella cuneopsis Cossm. sp.
902, 1158, 1164 ft.
Cylichnella infundibulata Cossm. sp.
1070, 1107, 1200, 1232, 1310, 1330 ft.

Cylichnella angustata Tate & Cossm. sp.
1107, 1615 ft.

Cylichnella, sp. indet.
605, 1150 (juv.).

Genus ROXANIA Gray.

Roxania, sp. indet. aff. *bullaeformis* Cossm.
730 ft.

Sub-Order PTEROPODA.

Fam. CAVOLINIIDAE.

Genus STYLIOLA Lesueur.

Styliola rangiana Tate.
1088 ft.

Genus VAGINELLA Daudin.

Vaginella eligmostoma Tate.
1310, 1410, 1426 ft.

CLASS CEPHALOPODA.

Order NAUTILOIDEA.

Fam. CLYDONAUTILIDAE.

Genus ATURIA Bronn.

Aturia australis McCoy.
660, 741 ft.

Phylum ARTHROPODA.

Sub-class EUCRUSTACEA.

Super-Order OSTRACODA.

Section PODOCOPA.

Fam. CYPRIDAE.

Genus ARGILLOECIA G. O. Sars.

Argilloecia badia G.S.B.
684, 746, 902, 938, 1050, 1060, 1310, 1318 ft.

Genus AGLAIA G. S. Brady.

Aglaia clavata G.S.B.
605, 654, 990, 1025, 1034, 1088, 1107, 1138, 1164, 1259, 1295, 1310 ft.

Genus MACROCYPRIS G. S. Brady.

Macrocypris decora G.S.B.
605, 741, 758, 786, 800, 902 ft.

Macrocypris maculata G.S.B.
630 ft.

Macrocypris tumida G.S.B.
694 ft.

Genus **PONTOCYPRIS** G. O. Sars.

Pontocypris attenuata G.S.B.
719 ft.
Pontocypris subreniformis G.S.B.
1160 ft.

Fam. Bairdiidae.

Genus **BAIRDIA** McCoy.

Bairdia amygdaloides G.S.B.
476, 605, 623, 674, 938, 995, 1025, 1090, 1240, 1318, 1465, 1470, 1615 ft.
Bairdia australis Chapm.
605, 630, 640, 654, 670, 690, 694, 700, 719, 758, 786, 800, 902, 1088, 1138, 1150, 1164, 1170, 1180, 1240, 1320, 1360 ft.
Bairdia foveolata G.S.B.
1295 ft.

Fam. Cytheridae.

Genus **CYTHERE** Müller.

Cythere scintillulata G.S.B.
654, 800, 1034, 1070, 1138, 1318, 1608 ft.
Cythere ovalis G.S.B.
1360 ft.
Cythere laganella G.S.B.
719, 726 ft.
Cythere acupunctata G.S.B.
489, 585, 726 ft.
Cythere crispata G.S.B.
730 ft.
Cythere sorrentae Chapm. & Cresp.
938, 1088, 1090 ft.
Cythere flexicostata Chapm.
741, 1060 ft.
Cythere dictyon G.S.B.
476, 605, 623, 630, 660, 684, 741, 786, 850, 938, 990, 995, 997, 1025, 1034, 1050, 1138, 1360, 1465 ft.
Cythere demissa G.S.B.
476 ft.
Cythere foveolata G.S.B.
741 ft.
Cythere militaris, G.S.B. sp.
605, 990, 997 ft.
Cythere normani G.S.B.
598, 694, 730, 741, 758, 990, 997, 1060, 1088, 1090, 1107, 1160, 1259, 1318, 1360 ft.
Cythere obtusalata G.S.B.
623, 690 ft.
Cythere postdeclivis Chapm.
741 ft.
Cythere lactea G.S.B.
1360 ft.

Cythere polytrema G.S.B.
684, 758 ft.

Cythere parallelogramma G.S.B.
598, 630, 640, 694, 741, 746, 1060 ft.

Cythere caudispinosa Chapm. & Cresp.
605, 640, 670, 730, 786, 1060, 1088 ft.

Cythere pumila G.S.B.
476 ft.

Cythere rastromarginata G.S.B.
741 ft.

Cythere reussi G.S.B.
1050 ft.

Cythere scabrocuneata G.S.B.
630, 741, 786, 1160, 1320 ft.

Cythere scutigera G.S.B.
850, 1060, 1088 ft.

Cythere quadriaculeata G.S.B.
605, 640, 654, 726, 741, 1034, 1050, 1360 ft.

Cythere lubbockiana G.S.B.
1107 ft.

Cythere canaliculata Rss. sp.
476, 605, 660, 674, 741, 902, 1060, 1138 ft.

Cythere baragwanathi Chapm. & Cresp.
476, 489 ft.

Genus KRITHE Brady, Crosskey & Robertson.

Krithe producta G.S.B.
605, 850 ft.

Krithe eggeri Chapm.
690, 850, 938, 1090, 1138 ft.

Genus LOXOCONCHA G. O. Sars.

Loxoconcha alata G.S.B.
623, 850 ft.

Loxoconcha australis G.S.B.
623, 630, 670, 690, 741 ft.

Loxoconcha avellana G.S.B.
476, 605, 670 ft.

Genus XESTOLEBERIS G. O. Sars.

Xestoleberis curta G.S.B.
476, 997 ft.

Xestoleberis margaritea G.S.B.
1070 ft.

Xestoleberis foveolata G.S.B.
990, 995, 997 ft.

Xestoleberis variegata G.S.B.
605, 741, 1090 ft.

Genus CYTHERURA G. O. Sars.

Cytherura praemucronata Chapm. & Cresp.
1088 ft.

Cytherura cf. *lilljeborgii* G.S.B.
674 ft.

Genus CYTHEROPTERON G.O. Sars.

Cytheropteron wellingtoniense G.S.B.
623 ft.

Cytheropteron praeantarcticum Chapm.
476, 598, 670, 674 ft.

Cytheropteron assimile G.S.B.
476 ft.

Genus BYTHOCYTHERE G. O. Sars.

Bythocythere arenacea G.S.B.
605 ft.

Bythocythere keblei Chapm. & Cresp.
623 ft.

Genus PSEUDOCYTHERE G. O. Sars.

Pseudocythere caudata G. O. Sars.
730 ft.

Section PLATYCOPA.

Fam. CYTHERELLIDAE.

Genus CYTHERELLA Rupert Jones.

Cytherella lata G.S.B.
826, 1088, 1608, 1680 ft.

Cytherella pulchra G.S.B.
605, 623, 630, 640, 654, 661, 670, 674, 684, 694, 741, 786, 850, 902, 976, 990, 995, 997, 1034, 1050, 1090, 1259, 1560 ft.

Cytherella polita G.S.B.
640, 730, 758, 786, 850, 997, 1107, 1310, 1360, 1470, 1608, 1615, 1658, 1667, 1680 ft.

Cytherella punctata G.S.B.
605, 623, 630(?), 640, 654, 661, 694, 741, 746, 786, 902, 976, 990, 997, 1034, 1060, 1088, 1107, 1150, 1164, 1259, 1295, 1310, 1360, 1461, 1465, 1549, 1560 ft.

Cytherella sulcosa Chapm. & Cresp.
997 ft.

Cytherella intermedia Chapm. & Cresp.
1025, 1050, 1088, 1090, 1107, 1138, 1310 ft.

Cytherella araneosa Chapm. & Cresp.
1360 ft.

Cytherella auricula Chapm.
605, 640, 684, 746, 997, 1034, 1060, 1138, 1286, 1295, 1320, 1400, 1470, 1549, 1560, 1693 ft.

Cytherella subtruncata Chapm.
661, 726, 758, 1070, 1259, 1549, 1680 ft.

Cytherella truncata G.S.B.
605 ft.

Super-Order **CIRRIPEDIA.**

Order **THORACICA.**

Fam. LEPADIDAE.

Genus SCALPELLUM Leach.

Sub-Genus ARCOSCALPELLUM Hoek.

Scalpellum (*Arcoscalpellum*) *dunni* Chapm. & Cresp.
661, 730 ft.

Scalpellum (*? Arcoscalpellum*) *meridianus* Chapm. & Cresp.
1230 ft.

Fam. BALANIDAE.

Genus BALANUS Lister.

Sub-genus MEGABALANUS Hock.

Balanus (*Megabalanus*) *decorus* Darwin.
324, 343 ft.

Balanus (*Megabalanus*) cf. *psittacus* Molina sp.
623 ft.

Sub-genus BALANUS sensu stricto.

Balanus (*Balanus*) *amphitrite* Darwin var. *acutus* Withers.
324, 741 ft.

Phylum VERTEBRATA.

Class PISCES.

Sub-class TELEOSTEI.

Teleostean Fishes, Otoliths of.
605, 654, 730, 758, 1088, 1191, 1204, 1220, 1240, 1410, 1615, 1640 ft.

Fish vertebrae, indet.
660 ft.

Fish tooth, indet.
1215 ft.

Coprolites of (?) fishes.
1640 ft.

Fish remains, indet.
1446 ft.

V.—NOTES ON THE FAUNAS AND STRATIGRAPHIC HORIZONS.

A.—General Remarks.

The Sorrento bore is unique in providing a succession of strata of the Cainozoic system more complete than any other that has been made in South-eastern Australia. There is no doubt that the core samples represent a succession from Balcombian to Holocene. It is unfortunate, however, that the boring was not continued down to the actual base of the Tertiary beds, and it would be in the interests of science if this could be done at a later date. For the present, therefore, we can only say that the boring has penetrated some way down into the Balcombian.

In the course of the detailed examination of the bore and its contents, we have been struck with the fact that this area of subsidence has not only been persistent from such early times, but has been continuous, and it has more or less kept within certain depths. This view is based on the fact that, even in the Balcombian series, we have quite a number of species which range upwards, and are even found living at the present day, in most cases in lower latitudes, as, for example, off the New South Wales and Queensland coasts in fairly deep water. Such persistent types amongst the Mollusca are *Nuculana miliacea* (618-1,615 feet), living off New South Wales at 41-111 fathoms; *Pyramidella jonesiana* (670-1,410 feet), living in Westernport and off Flinders, Victoria; and *Rissoina lintea* (694-1,549 feet), living in Tasmanian waters.

Of the Ostracoda found living in the Southern Ocean, we find certain species similarly having a long vertical range, such as *Argilloecia badia* (684-1,318 feet), *Aglaia clavata* (605-1,310 feet), *Bairdia amygdaloides* (476-1,615 feet), *B. australis* (605-1,360 feet), *Cythere scintillulata* (654-1,608 feet), *C. dictyon* (476-1,465 feet), *C. normani* (598-1,360 feet), *C. quadriaculeata* (605-1,360 feet), *Cytherella pulchra* (605-1,560 feet), *C. polita* (640-1,680 feet), *C. punctata* (605-1,560 feet).

In view of this tendency for many of the fossil species to have a long geological range, the data for working out the geological horizons of the bore are not so numerous or satisfactory as we had wished. On the other hand, there are assemblages or faunal aspects in certain of the horizons which enable us to indicate, within more or less wide limits, the main divisions of the vertical section passed through in the bore.

B.—Notes on the Faunas.

(a) Foraminifera—

Amongst the porcellanous Foraminifera the genera *Biloculina, Spiroloculina, Quinqueloculina,* and *Cornuspira* are best represented. The commonest and most extensively distributed of the genus *Quinqueloculina* are *Q. vulgaris* (476-1,693 feet), *Q. lamarckiana* (690-1,667 feet), *Q. schreiberiana* (694-1,693 feet), and *Q. agglutinans* (598--1,693 feet).

Of the genus *Spiroloculina, S. dispansa* and *S. asperula* also have an extensive range from the Kalimnan to Balcombian.

Other long-ranging forms of the Porcellanea are *Sigmoïlina sigmoidea* (623-1,693 feet), *Cornuspira foliacea* (605-1,693 feet), and *C. crassisepta* (654-1,680 feet).

Of the rare forms of the porcellanous Foraminifera in this boring, we have *Biloculina angusta* at 995 feet (Janjukian), earlier described from Grice's and Kackeraboite Creeks, *B. laevis* at 1,138 feet and 1,320 feet (Janjukian to Balcombian), *B. tubulosa* at 746 feet (Upper Miocene), *Spiroloculina acutimargo* at 730 feet (Kalimnan), *Triloculina subrotunda* at 690 feet (K.), *Q. gracillis* at 958 feet (J.),*Q. bicornis* at 476 feet (Pleistocene), *Q. carinata* at 990 feet (J.), *Q. contorta* at 598 feet (K.), *Q. sclerotica* at 1,107 feet (J.), *Massilina secans* at 605 feet (K.), *Planispirina sphaera* at 997 feet (J.), and *Cornuspira carinata* at 1,150 feet (J.).

Amongst the arenaceous forms, the *Astrorhizidae* are totally unrepresented. Of the *Lituolidae* there are only two species—*Haplophragmoides sphaeroidiniforme* at 997-1,680 feet, and *Ammodiscus incertus* at 1,560 feet.

The family of the *Textulariidae* is well represented by both arenaceous and hyaline types. Those restricted to the Kalimnan series are *Gaudryina pupoides, Clavulina parisiensis* var. *multicamerata, C. textulariodea, Cassidulina subglobosa* and *Pleurostomella subnodosa.* One species is restricted to our supposed Upper Miocene, namely, *Gaudryina filiformis.*

The family *Globigerinidae* is sparsely represented. *Globigerina bulloides* ranges throughout the series from Holocene to Balcombian, *Sphaeroidina bulloides* from Kalimnan to Balcombian, and *Globigerina triloba* from Janjukian to Balcombian, whilst the only restricted form is *Globigerina inflata,* which was found at 1,333 feet (Balcombian).

Amongst the family *Rotaliidae, Truncatulina lobatula* and *T. ungeriana* range throughout the series (Holocene to Balcombian). The restricted forms are as follows:—*Discorbina orbicularis* and *D. rosacea* to *Pleistocene; Discorbina vilardeboana, D. araucana, D. dimidiata, D. parisiensis, D. pileolus, D. turbo, Anomalina polymorpha, Pulvinulina karsteni, P. repanda, P. punctulata, P. schreibersii* to Kalimnan; *Discorbina vesicularis* restricted to Upper Miocene and top of Janjukian; *Truncatulina margaritifera, Pulvinulina elegans, P. scabricula* to the Janjukian; and *Spirillina inaequalis, Rotalia orbicularis* to the Balcombian.

As regards the Kalimnan assemblage, this is a rather strikingly shallow-water fauna.

The few records of the family *Nummulitidae* found in the boring are interesting. The longest ranging form is *Polystomella macella* (Pleistocene to Balcombian). This form is almost restricted to shallow water at the present day, especially in the Southern Ocean, and this may point to periodic shallowing even in the Balcombian sediments of the boring. *P. subnodosa* (Pleistocene to Kalimnan), as a living form, appears to be characteristic of warm water areas amongst shallow deposits. Since it is found here from Pleistocene to Kalimnan, it may represent a warm water denizen persisting into the Pleistocene just as the *Marginopora* is found in the raised beaches of Southern Australia.

Nonionina depressula ranges from the Kalimnan to Balcombian, and it would appear that its occurrence in the earlier part of the series further supports the idea that portions of the Balcombian may have been laid down in fairly shallow water, since this species is almost essentially of a littoral character.

Amongst the restricted forms of this family, *Polystomella striatopunctata* is Pleistocene at 489 feet. It is usually found in deposits of 100 fathoms. In later fossil deposits of Australia, it appears to be more typical of shore line and estuarine deposits. *P. striatopunctata* var. *evoluta* is Kalimnan, and is a variety which was described from the Mallee bore; it was there obtained from the Kalimnan down to the basal beds, including the summit of the Janjukian.

Nonionina turgida is restricted to the Janjukian. As a recent species it is more typically shallow water, which may account for its rarity and restriction in the series. *N. pompilioides* (Balcombian) is exclusively a deep-water form in recent soundings. An interesting occurrence in this series is *Polystomella craticulata* (Janjukian), which, in recent deposits, is practically restricted to shallow water of tropical and subtropical seas. Its habitat points to the fairly high temperature of the Janjukian sea, whilst at the same time may indicate a shallowing at the depth where it was found at 1,060 feet in the borings.

Operculina complanata (Janjukian) is another species which is usually restricted to the littoral zone, but occasionally found in deeper water.

(b) **Anthozoa**—

It is interesting to note the stratigraphical similarity of the elsewhere Kalimnan coral fauna with that found in the Sorrento bore for the depths allocated to this horizon. These restricted forms are *Flabellum curtum* and *F. gippslandicum,* both from the Gippsland Lakes; *Bathyactis beaumariensis,* from Beaumaris; and *Graphularia kalimnae,* our new species, which we also find at Beaumaris. There is also one other form in the Sorrento Kalimnan, viz., *Deltocyathus verconis,* which is found living off the coast of South Australia. *Parasmilia lucens* is restricted to Janjukian, and has been known hitherto only from the Janjukian series of Cape Otway.

Of the Balcombian restricted forms, we have here only one—*Flabellum gambierense.* This is not confined to the Balcombian elsewhere, but is common to the Janjukian and Balcombian.

Of the Anthozoan fauna, a number of species have a continuous range from Kalimnan down to Balcombian—*Sphenotrochus emarciatus, S. alatus, Bathyactis lens,* and *Trematotrochus fenestratus.* Of the Alcyonarians, *Mopsea tenisoni* ranges through the Janjukian and Balcombian.

(c) **Echinodermata**—

The only representative of the Asterozoa in the present boring is *Pentagonaster,* which is confined to the Kalimnan, although in other localities it is more commonly representative of the Janjukian. Its Kalimnan horizon is confirmed by association with a true Kalimnan molluscan assemblage.

Sea-urchins are represented by two Cidaroids, which are here recognized as new species, as well as a sea-urchin, *Echinocyamus patella,* here restricted to the Janjukian. The new species of Cidaroids, *Goniocidaris prunispinosa* occurs from Janjukian to Balcombian, and *G. pentaspinosa* in the Balcombian series.

(d) **Annelida**—

Remains of Vermes are rare, and more or less indeterminate, with the exception of *Ditrupa cornea,* var. *wormbetiensis,* which ranges from

the Kalimnan to Janjukian. The distribution of this variety of *Ditrupa*, which elsewhere occurs abundantly in the Janjukian, here appears most commonly in the basal part of the Kalimnan, in Upper Miocene, and to the basal part of the Janjukian.

(e) Polyzoa—

Some interesting comparisons might be made as regards the distribution of the Polyzoa; for example, the cyclostomatous *Crisia scalaris*, which MacGillivray records from Corio Bay, here occurs from Janjukian to Balcombian. *Idmonea hochstetteriana*, which is a typical Janjukian and Balcombian form in Victoria, and Middle Tertiary in New Zealand, is found in this boring in the Janjukian only. A large number of the Cheilostomes occur through the series from Kalimnan to Balcombian, whilst others range from Kalimnan to Janjukian. These are as follows:—*Melicerita acutimarginata* (K.-J.), *M. angustiloba* (K.-B.), *Cellaria contigua* and *C. rigida* (K.-B.), *Lunulites canaliculata* (K.-J.), *L. rutella* (K.-B.), *Selenaria concinna* (K.-B.), *S. maculata* (K.-B.), *S. marginata* (K.-B.), *Bipora cancellata* (K.-J.), *B. philippinensis* (K.-B.), and *Cellepora fossa* (K.-B.).

(f) Brachiopoda—

The distribution of the Brachiopods affords some interesting, and, at the same time, rather problematical data, but in the main confirmatory of the horizons to which they are here assigned. *Murravia catinuliformis*, which is here restricted to Kalimnan, ranges in the Victorian Tertiary from Balcombian to Kalimnan. *M. flindersi* is a typical Janjukian fossil, and also occurs here in the same horizon. *Terebratula tateana* is elsewhere common to the Janjukian and Balcombian, but is here restricted to the Janjukian. *T. aldingae* has hitherto been unknown out of the Janjukian series, but here it seems to range somewhat higher, being found about midway in the Kalimnan. Another form which, hitherto, was known only from the Janjukian of the Mallee bores, namely, *Cryptopora acutirostra*, is here found about midway in the Kalimnan. *Magadina compta*, elsewhere ranging from Kalimnan down to Balcombian, is here restricted to the Kalimnan; this is also true of *Magadinella woodsiana*.

(g) Pelecypoda—

At the base of the superficial series in the boring, that we would refer to the oldest Pleistocene, we find the living *Spisula trigonella* in great abundance. Proceeding downwards the bivalves are remarkably scarce, until we reach the Kalimnan, where we find such typical forms as *Nuculana acinaciformis, Limopsis beaumariensis, Glycymeris striatularis, G. halli, Neotrigonia lamarcki, Chlamys antiaustralis, Venericardia trigonalis, V. solida, Erycina micans, Lucina araea, Dosinia johnstoni, Katelysia strigosa, K. multistrigosa, Antigona cognata, Clausinella subroborata, Bassina paucirugata, Donax dixoni, Mactra axiniformis, Zenatiopsis angustata*, and *Corbula coxi*.

Amongst the bivalves restricted in the present boring to what we believe to be Kalimnan, there are a few otherwise typically Junjukian forms, but these are not numerous enough to disturb the conclusions we have arrived at in regard to the general limitation of the Kalimnan series. These otherwise Janjukian forms are *Limaea transenna, Crassatellites abbreviata*, and *Lucina leucomomorpha*.

The Pelecypods, which are restricted to what we conceive as the Upper Miocene, are *Modiolus lineus, Antigona dimorphophylla,* and *Condylocardia tenuicostae.* The latter is found in the Mallee Bores in a mixed series, possibly passage beds, between Kalimnan and Janjukian. Its occurrence here would, therefore, help to confirm the idea of an Upper Miocene horizon.

In the case of Molluscan species, which in other localities seem to indicate a Janjukian horizon, many of these from the Sorrento Bore show a remarkable extension in range both upwards into Kalimnan and downward into Balcombian. This can only be accounted for by the generally equable conditions of sedimentation which are seen in the whole of the section, comprising the Upper Balcombian to the Kalimnan.

Amongst the elsewhere restricted Janjukian species here ranging beyond are—*Nuculana crebrecostata* (K-B); *Limopsis insolita* (base of K): and *Crassatellites abbreviata* (about middle of K).

The species of Pelecypoda which are restricted in the Sorrento boring to what we believe are Janjukian strata are abundant, comprising 23 species. They are—*Nuculana fortis* (previously living); *Sarepta planiuscula* (J. of Adelaide Bore) *Cucullaea corioensis* (elsewhere K-B), *Lissarca cincturata* (new), *Arca celleporacea* (K-B), *A. cainozoica* (J-B), *Philobrya bernardi* (J-B), *Trigonia tubulifera* (elsewhere J-B), *Chlamys* cf. *keiloriana* (elsewhere J.), *Pinna* sp., *Pseudamussium yahliensis* (elsewhere K.-B.), *Propeamusium atkinsoni* (elsewhere K-B), *Lima bassi* (elsewhere J-B), *Crenella globularis* (elsewhere J-B), *Cuna multilamella* (elsewhere J though Tate records it from the Balcombian of Muddy Creek), *C. lamellata* (elsewhere J), *Venericardia* cf. *trigonalis* (elsewhere K-J), *V. latissima* (elsewhere J), *Lucina projecta* (elsewhere B), *Neolepton novacambricum* (previously living), *Cardium hemimeris* (elsewhere B), *Protocardia ornithopetronica* (new) and *Lepton crassum* (elsewhere J).

In regard to the widely-ranging forms in the Sorrento Bore (from K-B), we find *Nucula obliqua* (living to B elsewhere), *N. morundiana* (J-B elsewhere), *Nuculana woodsi* (also K-B elsewhere), *N. vagans* (also K-B elsewhere), *N. fontinalis* (also K-B elsewhere), *N. miliacea* (previously living, N.S.W.), *N. acuticauda* (originally described from Balcombian beds, but now has a similarly extensive range elsewhere), *Limopsis maccoyi* (also K-B elsewhere), *Chlamys foulcheri* (J-B elsewhere), *Dimya dissimilis* (also K-B elsewhere), *Venericardia scabrosa* (J-B elsewhere), *V. compacta* (also K-B elsewhere), *V. delicatula* (J-B elsewhere), *V. spinulosa* (K-B elsewhere), *Corbula pyxidata* (also K-B elsewhere).

(h) **Scaphopoda**—

Of species restricted to the Kalimnan of the Bore we have *Dentalium* cf. *largicrescens* (also K elsewhere), *D. semiaratum* (new, but related to the more extensively ranging *D. aratum*), and *D. latesulcatum* (also K elsewhere). The remainder of this group, viz., *Dentalium lacteolum* (elsewhere J-B), *D. subfissura* (elsewhere K-B), *D. mantelli* (elsewhere K-B), and *D. aratum* (elsewhere J-B), have, in the Sorrento Bore, the extended range from Kalimnan to Balcombian.

(i) **Polyplacophora**—

The only species occurring in the Sorrento Bore is *Acanthochitona* cf. *chapmani,* a form lately described from the older beds of Muddy Creek (B).

(j) **Gasteropoda—**

The only Pleistocene Gasteropoda are represented by genera found on rocky shore lines at the present time, and are apparently of recent species. These were associated with the *Spisula* clays.

The species of Gasteropods restricted to the Kalimnan of the Bore are nearly all typical of the Kalimnan elsewhere, and there are only one or two exceptional cases where they have a downward range, as, for example, *Turritella conspicabilis* (which is both Kalimnan and Janjukian). Two species, however—*Turritella sturtii* and *Rissoina stevensiana*—were previously only known from Table Cape, in Janjukian beds. *Bittium turritelliforme,* here recorded fossil for the first time, is a living species in the Southern Ocean.

Of the species ranging from Kalimnan to Janjukian we record *Turritella acricula* and *T. murrayana,* which elsewhere have even a wider range of Kalimnan to Balcombian; *Ringicula tenuilirata,* making an earlier appearance in the Bore than elsewhere, where it is Janjukian and Balcombian.

Of the widely-ranging forms (K-B) in the Bore, besides a long list which compares with similar faunas elsewhere, we note that *Ancilla ligata* was hitherto confined to Janjukian strata.

The solitary Gasteropod species restricted to the Upper Miocene of the Bore is *Liotella capitata,* before only known from dredgings at 800 fathoms east of Sydney.

There is a very large number of Gasteropod species which are restricted to the Janjukian of the Bore. Those of typical Janjukian elsewhere include *Eutrochus fontinalis, Vermicularia rudis, Cerithiopsis mitchellensis, Pyrene oxleyi, Nassarius spiraliscabrus, Trophon halli* and *Bathytoma paracantha.* The remainder of the Sorrento restricted species are elsewhere Janjukian and Balcombian, with the exception of two Kalimnan forms, *Marginella muscarioides* and *Eucithara subglabra.* In the list of species restricted to the Janjukian series in the present Bore we note the largest proportion which elsewhere occur in both Balcombian and Janjukian strata. The tardy appearance of these forms in this boring, not until the Janjukian, may perhaps be accounted for by excessively deep, and therefore uncongenial, conditions prevailing until Janjukian times.

Amongst the sixteen species which range in the Bore from Janjukian to Balcombian only one of them we note is elsewhere restricted to the Janjukian, namely, *Marginella kitsoni.*

Amongst the twelve Gasteropods here restricted to the Balcombian, we have seven species entirely new, namely, *Brookula singletoni, Turbonilla mulderi, Eulimella nitidula, Haurakia gabrieli, Turritella medioplicatilis, Cerithiopsis reticosa,* and *Filodrillia steiroides;* one species is found living, *Odostomia deplexa; Turritella aldingae* is Kalimnan elsewhere; whilst three, *Murex trochispira, Mitrithara conospira,* and *Vaginella eligmostoma,* are Janjukian and Balcombian.

(k) **Cephalopoda—**

The only Cephalopod found in the Bore is *Aturia australis,* and this occurs in two horizons, Kalimnan and Upper Miocene, a species which is elsewhere of extensive range from Balcombian to Kalimnan.

(l) Ostracoda—

In the Pleistocene series of the Bore we have three previously described species, all of which are found living, namely, *Cythere demissa*, *C. pumila,* and *Cytheropteron assimile.* *Cythere baragwanathi* is a new species.

Species ranging from Pleistocene to Kalimnan comprise two living forms, namely, *Cythere acupunctata* and *Loxoconcha avellana,* whilst a third, *Cytheropteron praeantarcticum,* was found in the Mallee Bore in practically Upper Miocene strata.

Two species range from Pleistocene and Janjukian, both of which are living, namely, *Cythere canaliculata* and *Xestoleberis curta.*

There are two species of Ostracoda in the boring which have the remarkably long range of Pleistocene to Balcombian, and they are both living species; these are *Bairda amygdaloides* and *Cythere dictyon.*

There are eleven restricted Kalimnan species in the Bore, which, however, are also found living. One new species occurs, namely, *Bythocythere keblei.* Only one species ranges throughout the Kalimnan and Upper Miocene, which is also a living form, namely, *Loxoconcha australis.*

Those species ranging from Kalimnan to Janjukian comprise eight living forms. There is also a new species, *Cythere caudispinosa.* Those from Kalimnan to Balcombian comprise twelve living species; those restricted to Upper Miocene, three living species.

One of the species described for the first time from the Mallee Bore, namely *Cythere flexicostata,* here occurs in strata of similar age, which we now ascribe to the Upper Miocene.

Ostracoda restricted to the Janjukian comprise seven living species, whilst three are new, namely, *Cythere sorrentae, Cytherura praemucronata,* and *Cytherella sulcosa.*

There is only one species ranging from Janjukian to Balcombian, which is also new, namely, *Cytherella intermedia.* Of the restricted Balcombian Ostracoda we record two species of *Cythere* still living, namely, *C. ovalis* and *C. lactea,* whilst there is also a new species, *Cytherella araneosa.*

(m) Cirripedia—

Among the acorn barnacles we have, in the Pleistocene, *Balanus decorus;* this form is living. There is also *Balanus amphitrite* var. *acutus,* which ranges from Pleistocene to Upper Miocene, and is found in the Miocene of New Zealand. The Kalimnan is represented by *Balanus psittacus,* a living form.

Of the stalked barnacles we have *Scalpellum dunni,* a new species which is restricted to the Kalimnan, and *S. meridianus,* also new, restricted to the Janjukian.

(n) Pisces—

Otoliths of fishes range from Kalimnan to Balcombian.

C.—Stratigraphical Horizons.

Holocene.—Since these beds naturally embrace the modern types of accumulation we have here only included the loose dune sand which was obtained down to 67 feet. This included foraminiferal material, such as may be gathered on some of the sandy shore-lines around Port Phillip.

Pleistocene.—We have regarded the limiting depths of the Pleistocene, as between 112 feet and 489 feet in this Bore. This series comprises Mollusca which are all of recent species, and the basal bed of the series (489 feet) exactly resembles estuarine beds found at slight depths at the mouth of most Victorian rivers. The Pleistocene Foraminifera and Ostracoda also show Recent and Sub-recent aspect, and from the nature of the deposits are similar to those forming at the present day, especially as regards the mud accumulations. The dune rock, in its sporadic occurrences, is consolidated exactly like the old Sorrento limestone, which contains extinct marsupials. This is additional evidence for regarding the Pleistocene series, as here marked off, to be referable to that division.

At certain intervals in the upper part of the Bore there is evidence of successive fluviatile and estuarine deposits, which probably point to the influence of river channels antedating that shown at the present time by the South Channel, a remnant of the old Yarra. It is unfortunate that all the cores in continuity were not secured, especially in this part of the Sorrento boring, for had that been done we should have had a complete history of the movements connected with the birth of the old Yarra River.

Werrikooian.—There is no tangible palaeontological evidence on which to work in regard to the delimitation of this division, but, in lieu of better evidence, we have taken the depth from 490 feet down to 520 feet as probably comprised in this series. The affinities of the Werrikooian as understood from the type locality in Western Victoria seem to be just as likely related to the Pleistocene as to the Pliocene, of which it was made the upper stage. In the present series allocated provisionally to the Werrikooian at the depths above indicated, the nature of the deposits, consisting of ochreous sandy clay and consolidated microzoic sandstone, show a good deal of relationship to the Pleistocene. Two doubtful points are here raised—(1) as to the true relationship of the Werrikooian as found in other localities; and (2) as to the claim it may have, at all events to this Bore, to a separate standing as a geological stage.

Kalimnan.—This stage, as we here interpret it, commences at 585 feet and extends down to 730 feet. It unfortunately happens that the cores after 520 feet and before 580 feet were not preserved, and therefore the upper limiting depth is not determinable. At 585 feet it is interesting to note the rock consists of shell, sand, and grit, with polished pebbles. Even the microscopic shells were abraded, so that the evidence points to the deposit being of shallow-water origin and formed between tides. At first one might draw the conclusion that as this was essentially a shallow-water deposit it might well form the base of the Werrikooian above, but from the fact that it contains several species of Gasteropods which are elsewhere peculiar to Kalimnan deposits it may, of course, be argued that the Kalimnan fauna extended higher in the series than the evidence shows us in the type locality of Kalimna, but of that we have no positive proof.

Throughout this series, which we know as Kalimnan, there are numerous species which make the fauna selected distinctive. Amongst these we might mention the corals *Flabellum curtum* and *F. gippslandicum, Bathyactis beaumariensis* and *Graphularia kalimnaé;* of the Polyzoa, *Selenaria marginata* var. *spiralis;* of the Pelecypoda, *Nuculana*

acinaciformis, Glycymeris halli. G. convexus, Chlamys antiaustralis, Venericardia solida, Antigona cognata, Clausinella subroborata, Bassina paucirugata, Donax dixoni, Mactra axiniformis, and *Corbula coxi;* of the Scaphopoda, *Dentalium latesulcatum;* of the Gasteropoda, *Liopyrga quadricingulata, Eglisia triplicata, Calyptraea crassa, C. kalimnae, Polinices substolida, Epigrus chrysalidus, Nassarius crassigranosus, Olivella nymphalis, Ancilla orycta, Ancilla papillata, Terebra geniculata,* and *Eucithara subglabra.*

Of the anomalous forms, ranging from Kalimnan to Janjukian in the Bore, but hitherto of Kalimnan or younger, may be mentioned *Neotrigonia acuticostata* and *Venericardia calva.*

Upper Miocene.—In all previous sections of our Tertiaries there has been difficulty in determining the succession of the Lower Pliocene and the typical Miocene beds, which, in their strong development, appear to belong to the Middle Miocene and older. Consequently, there seems to be a gap to be filled in, which we could refer to the Upper Miocene, corresponding to the Awamoan of New Zealand. This Sorrento bore section, therefore, should furnish some kind of evidence to help us to solve this problem. We have made the break between the typical Janjukian and the overlying Kalimnan to occur between 741 feet and 746 feet, there being a hiatus from 731 feet to 740 feet through the omission to preserve the cores at those depths.

Of the very sparse fauna in this supposed Upper Miocene series we have three species of Foraminifera which have an extensive vertical range, namely, *Biloculina tubulosa, Gaudryina filiformis,* and *Lagena elongata;* three species of Pelecypoda, *Modiolus lineus* (a hitherto living species), *Antigona dimorphophylla,* ranging from Balcombian to Kalimnan, and *Condylocardia tenuicostae.* This latter species was described from specimens in the Mallee Bores where there occurred a mixed fauna of Janjukian and Kalimnan and where, presumably, the horizons could be referred similarly to the Upper Miocene. Of the Gasteropods, *Liotella capitata,* which hitherto was known only from recent dredgings, is found here. The Ostracods include *Cythere foveolata,* a living species, and *C. postdeclivis,* which was found in the Mallee Bores at the top of the Janjukian and in the mixed Kalimnan and Janjukian which we may now regard as Upper Miocene, and *C. rastromarginata,* which is found living.

Janjukian.—The limiting depths for the typical Janjukian series are here given as from 758 to 1,295 feet, the gap between the lowest Upper Miocene (746 feet) and the highest Janjukian is occasioned by the absence of the cores from our series.

In the presence of so many extensively-ranging species as we find in all Janjukian strata, it is difficult to draw the exact line which may delimit the upper and lower beds. Therefore, in the present Bore it may be regarded as provisional, especially in the boundary between the Janjukian and Balcombian, which extends from 1,295 to 1,310 feet. No data of any value can be obtained from the lithological characters of the bore cores at some distance either upward or downward from the boundary we have drawn between the Janjukian and Balcombian for, in this part of the series, sediments vary only slightly in the general character of grey to green sandy marls with shells. Our conclusions, therefore, have to be based on the palaeontological contents.

Certain of the Mollusca which are characteristic of Janjukian strata elsewhere seem to be confined to the limits we have assigned to these beds, such as *Eutrochus fontinalis, Vermicularia rudis,* and *Bathytoma paracantha.* In passing, however, we may mention an anomalous factor in the case of *Venericardia gracilicostata,* which ranges into the upper beds of the Balcombian, the form elsewhere being distinctive of Table Cape and other Janjukian beds.

Another corroborative element in the establishment of the Janjukian on the present lines is the striking abundance of the Polyzoa, when compared with the number found in the Balcombian series, there being nearly twice as many in the former.

Balcombian.—From the depth of 1,310 feet to the lowest bore core at 1,693 feet, we regard the series as representing the uppermost part of the Balcombian. The comparative abundance of *Vaginella* in this series gives some confirmation of this. In view of the Balcombian as represented here belonging to the upper part of the series, it would be unreasonable to expect many forms restricted to the Balcombian; in other words, there should be a community of species above and below the boundary line which we have made as the summit of the Balcombian in this bore. As a matter of fact, more than half the restricted Balcombian species have been described here for the first time, and some of these have been identified among the unnamed species in the Dennant Collection from Balcombian strata elsewhere.

Although the lithological characters, as before mentioned, show little variation and are nearly similar to the Janjukian, we notice in some cases a transition at intervals into green sand, denoting deeper water conditions and current action. From the available information derived from the present bore, it is safe to assume that the Balcombian was penetrated to some considerable amount. It will, however, be necessary to either deepen the bore or carry out another before we can say anything about the full succession of our Tertiary beds in this locality. In the interests of economic geology, this should be carried out as soon as possible. It is noteworthy that, on the western shores of Port Phillip, the Balcombian beds, at the Newport and Altona Bay borings, were more variable in character, for they showed, from the base upwards, gravels, sandy clay, lignitiferous clay, shelly sand, brown clay, brown coal, and pyritous clay in the limestone, where probably the Balcombian deposition ended. Moreover, as the total depth of the Balcombian on sands and bedrock was only 512 ft. 2 in., it appears that the Williamstown and Laverton area represent the edge of a basin of marine deposits, terrestrial in part, of which we have the deeper portions at Sorrento. Thus the Port Phillip trough basin, sinking from Balcombian times at least, contained marine muds and sands laid down against the scarp of the Cape Schanck fault on its eastern side, and which rapidly shallowed to the west.

This deepening of the Balcombian sea to the east accounts for the absence of lignite beds in the Sorrento Bore. Incidentally, we may note that these lignite beds of the Laverton area are not to be confused with later brown coal deposits as at Yallourn, which demonstrably fit in with the Upper Miocene, or thereabouts.

D.—List of New Species.

Foraminifera.

Spiroloculina dispansa Chapman & Crespin.
Frondicularia nuda Chapm. & Cresp.
Truncatulina mundula B. P. & J. var. *carinata* Chapm. & Cresp.

Anthozoa.

Graphularia kalimnae Chapm. & Cresp.

Echinoidea.

Goniocidaris prunispinosa Chapman & Cudmore.
Goniocidaris pentaspinosa Chapman & Cudmore.

Polyzoa.

Melicerita sorrentae Chapm. & Cresp.
Amphiblestrum ctenostoma Chapm. & Cresp.
Amphiblestrum spathuloides Chapm. & Cresp.

Brachiopoda.

? Malleia planidorsata Chapm. & Cresp.

Pelecypoda.

Lissarca cincturata Chapm. & Cresp.
Limopsis affinitalis Chapm. & Cresp.
Arca (*Barbatia*) *microündula* Chapm. & Cresp.
Arca (*Barbatia*) *dissimulina* Chapm. & Cresp.
Anomia tatei Chapman and Singleton.
Myodora gabrieli Chapm. & Cresp.
Cuspidaria veilicata Chapm. & Cresp.
Cardita sorrentae Chapm. & Cresp.
Venericardia archaenepeanensis Chapm. & Cresp.
Protocardia ornithopetronica Chapm. & Cresp.
Antigona dennanti Chapm. & Cresp.
Katelysia multistrigosa Chapm. & Cresp.
Clausinella shelfordensis Chapm. & Cresp.

Scaphopoda.

Dentalium semiaratum Chapm. & Cresp.

Gasteropoda.

Brookula singletoni Chapm. & Cresp.
Teinostoma calva Chapm. & Cresp.
Cyclostrema cornuspira Chapm. & Cresp.
Eulima bicurvata Chapm. & Cresp.
Turbonilla mulderi Chapm. & Cresp.
Turbonilia radicans Chapm. & Cresp.
Turbonilla constricta Chapm. & Cresp.
Eulimella nitidula Chapm. & Cresp.
Natica gatliffi Chapm. & Cresp.
Haurakia gabrieli Chapm. & Cresp.
Turritella acinella Chapm. & Cresp.
Turritella multicincturalis Chapm. & Cresp.
Turritella medioplicatiiis Chapm. & Cresp.
Cerithiella trigemmata Chapm. & Cresp.
Cerithiopsis reticosa Chapm. & Cresp.

Cerithiopsis mitchellensis Chapm. & Cresp.
Ataxocerithium serotinoides Chapm. & Cresp.
Trophon halli Chapm. & Cresp.
Trophon profundus Chapm. & Cresp.
Marginella crassidens Chapm. & Cresp.
Marginella globiformis Chapm. & Cresp.
Filodrillia steiroides Chapm. & Cresp.
Eucithara subglabra Chapm. & Cresp.
Etrema trophonalis Chapm. & Cresp.
Etrema praespurca Chapm. & Cresp.
Etrema pseudoelegans Chapm. & Cresp.
Guraleus volutiformis Chapm. & Cresp.

OSTRACODA.

Cythere sorrentae Chapm. & Cresp.
Cythere caudispinosa Chapm. & Cresp.
Cythere baragwanathi Chapm. & Cresp.
Bythocythere keblei Chapm. & Cresp.
Cytherura praemucronata Chapm. & Cresp.
Cytherella sulcosa Chapm. & Cresp.
Cytherella intermedia Chapm. & Cresp.
Cytherella araneosa Chapm. & Cresp.

CIRRIPEDIA.

Scalpellum (*Arcoscalpellum*) *dunni* Chapm. & Cresp.
Scalpellum (? *Arcoscalpellum*) *meridianus* Chapm. & Cresp.

E.—ACKNOWLEDGMENTS.

In the preparation of the foregoing work, we have been very materially assisted in regard to comparative faunas of the Australian Tertiaries by having access to Mr. F. A. Cudmore's collection, and he has allowed us to incorporate the descriptions of the new Goniocidarids which were eventually to have appeared in a later paper. The recent aspect of the faunas and the general diagnoses of the new Mollusca have been put on a surer basis by the ready assistance of Mr. C. J. Gabriel, who has given us the benefit of his wide knowledge of Australian recent Mollusca.

To Mr. F. A. Singleton, M.Sc., we are indebted for his generous help in literature, and in regard to critical determinations of genera incorporated in this fauna, especially in reference to the difficult group of the *Anomiidae*.

The drawings, made directly from the specimens by Miss Winifred Chapman, have greatly enhanced the value of the specific diagnoses of new species.

VI.—BIBLIOGRAPHY.

Angas, G. F., 1877.—Descriptions of One Genus and Twenty-five Species of Marine Shells from New South Wales. *Proc. Zool. Soc.,* pp. 171-177, pl. xxvi.

Brady, G. S., 1865.—On New or Imperfectly Known Species of Marine Ostracoda. *Trans. Zool. Soc. Lond.,* vol. v., pp. 359-393, pls. lvii.-lxii

———, 1868.—Les Fonds de la Mer, vol. i., pp. 65-72.

———, 1878.—A Monograph of the Ostracoda of the Antwerp Crag. *Trans. Zool. Soc. Lond.,* vol. x., pt. viii., No. 1, pp. 379-409, pls. lxii.-lxix.

Brady, H. B., 1884.—Report on the Foraminifera. "Challenger" Reports. Zoology, vol. ix., pts. i. and ii.

Brady, H. B., Parker, W. K., and Jones, T. R., 1888.—On some Foraminifera from the Abrolhos Bank. *Trans. Zool. Soc. Lond.,* vol. xii., pp. 211-239, pls. xli.-xlvi.

Busk, G., 1859.—Polyzoa of the Crag. *Pal. Soc. Mon.,* vol. xi.

Chapman, F., 1911.—In Ann. Rept. of the Secretary for Mines for the Year 1910, Victoria.

———, 1913.—Descriptions of New and Rare Fossils obtained by Deep Boring in the Mallee. Part I. Plantae; and Rhizopoda to Brachiopoda. *Proc. Roy. Soc. Vict.,* vol. xxvi. (New Series), pt. i., pp. 165-191, pls. xvi.-xix.

———, 1916.—Report on the Foraminifera and Ostracoda from Elevated Deposits on the Shores of Ross Sea. *Brit. Ant. Exped. Geol.,* vol. ii., pp 27-52, pls. i.-vi.

———, 1926.—Cretaceous and Tertiary Foraminifera of New Zealand with an Appendix on the Ostracoda. *Pal. Bull. No. 11, Geol. Surv., N.Z.,* pp. 1-119, pls. i.-xxii.

———, and Gabriel, C. J., 1914.—Description of New and Rare Fossils obtained by Deep Boring in the Mallee. Part II., Mollusca. *Proc. Roy. Soc. Vict.,* vol. xxvi. (New Series), pt. ii., pp. 301-30, pls. xxiv.-xxviii.

———, and Parr, W. J., 1926.—Tertiary Foraminifera of Victoria, Australia.—The Balcombian Deposits of Port Phillip. Part II., *Journ. Linn. Soc. Lond., Zool.,* vol. xxxvi., pp. 373-399, pl. xvii.-xxi.

———, and Singleton, F. A., 1927.—Descriptive Notes on Tertiary Mollusca from Fyansford and other Australian Localities. Part I., *Proc. Roy. Soc. Vict.,* vol. xxxix., pt. ii., pp. 113-124, pls. x., xi.

Costa, O. G., 1857.—Foraminifera Fossili delle Marine Terziarie di Messina. *Mem. Accad. Sci. Napoli,* vol. ii., pt. ii. (1855).

———, 1857.—Paleontologia del Regno di Napoli, part i., 2. *Atti del Accademia Pontaniana,* vol, vii., p. 105, pls. ix-xxvii.

Cushman, J. A., 1913.—Monograph of the Foraminifera of the North Pacific Ocean. Part. III. Lagenidae.—*Bull. 71, U.S. Nat. Mus., Washington.*

———, 1915.—Monograph of the Foraminifera of the North Pacific Ocean. Part V. Rotaliidae.—*Bull. 71, U.S. Nat. Mus., Washington.*

———, 1917.—Monograph of the Foraminifera of the North Pacific Ocean. Part VI. Miliolidae.—*Bull. 71, U.S. Nat. Mus., Washington.*

Darwin, C,, 1854.—A Monograph on the Sub-Class Cirripedia, with Figures of all the Species. The Balanidae (or Sessile Cirripedes; the Verrucidae, &c. *Roy. Soc. Lond.*, 1854, pp. 1-684, pls. i.-xxx.

Dennant, J. D., 1904.—Descriptions of New Species of Corals from the Australian Tertiaries, pt. vii. *Trans. and Proc. Roy. Soc. S. Aust.*, vol. xxviii., pp. 52-76, pls. xxii-xxv.

Dennant, J. D., and Kitson, A. E., 1903.—Catalogue of the Described Species of Fossils (except Bryozoa and Foraminifera) in the Cainozoic Fauna of Victoria, South Australia, and Tasmania. *Rec. Geol. Surv. Vict.*, vol. i., pt. ii., pp. 89-147.

Finlay, H., 1924.—The Family *Liotiidae* Iredale, in the New Zealand Tertiary. Part I.—The Genus *Brookula*. *Trans. N. Z. Inst.*, vol. lv., pp. 526-531, pl. liii.

Goës, A., 1896.—Reports on the Dredging Operations off the West Coast of Central America, &c., carried on by the U. S. Fish Commission Steamer *Albatross*. *Bull. Mus. Comp. Zool. Harvard,* vol. xxix., No. 1, Cambridge.

Harris, G. F., 1897.—Catalogue of Tertiary Mollusca in the Department of Geology, British Museum (Natural History). Part I. *Australian Mollusca,* pp. 1-26, 1-407, and plates.

Hedley, C., 1900.—Studies on Australian Mollusca, pt. i., pp. 87-100. *Proc. Linn. Soc. New South Wales,* vol. xxv., p. 91, pls. iii., iv.

———, 1902.—Scientific Results of the Trawling Expedition of H.M.C.S. *Thetis*. Mollusca. Part I. *Mem. Aust. Mus.,* vol. iv., pt. iv., pp. 287-324, figs. 39-60.

———, 1903.—Scientific Results of the Trawling Expedition of H.M.C.S. *Thetis*. Mollusca. Part II. *Mem. Aust. Mus.,* vol. iv., pt. vi., pp. 327-402, pls. xxxvi.-xxxviii. and test figs.

———, 1906.—The Results of Deep Sea Investigations in the Tasman Sea. Part III. Mollusca from Eighty Fathoms off Narrabeen. *Rec. Aust. Mus.,* vol. vi., pp. 283-304, pls. liv.-lvi.

———, 1907.—The Results of Deep Sea Investigation in the Tasman Sea. II.—The Expedition of the *Woy Woy*. 2.—Mollusca from Eight Hundred Fathoms, Thirty-five miles E. of Sydney. *Aust. Mus. Rec.,* pp. 356-364, pls. lxvi.-lxvii.

———, 1909.—Mollusca from the Hope Islands, North Queensland. *Proc. Linn. Soc. New South Wales,* vol. xxxiv., pt. iii., pp. 420-466, pls. xxxvi.-xliv.

———, 1915.—Studies on Australian Mollusca. Part XII. *Proc. Linn. Soc. New South Wales,* vol. xxxix., pt. iv., pp. 695-755, pls. lxxvii.-lxxxv.

———, 1922.—A Revision of the Australian *Turridae*. *Rec. Aust. Mus.*, vol. xiii., 1920-22, pp. 213-359, pls. xlii.-lvi.

Heron-Allen, E., and Earland, A., 1924.—The Miocene Foraminifera of the "Filter Quarry," Moorabool River, Victoria, Australia. —*Journ. Roy. Microscopical Soc.*, pp. 121-186, pls. vii.-xiv.

Iredale, T., 1912.—New Generic Names and New Species of Marine Mollusca. *Proc. Malac. Soc.*, vol. x., pp. 217-228, pl. ix.

———, 1924.—Results from Roy Bell's Molluscan Collections. *Proc. Linn. Soc. New South Wales,* vol. xlix., pt. iii., pp. 179-278, pls. xxxiii.-xxxvi.

Jones, T. R., 1849.—Monograph of the Cretaceous Entomostraca (Pal. Soc.), pp. 1-40, pl. i.-vii.

———, 1890.—The Cretaceous Entomostraca (Supplement). *Pal. Soc. Mon.*, vol. xliii., pp. i.-vii., pp. 1-70, pl. i.-iv.

MacGillivray, P. H., 1895.—A Monograph of the Tertiary Polyzoa of Victoria. *Trans. Roy. Soc. Vict.,* vol. iv., pp. 1-166, pls. i.-xxii.

Maplestone, C. M., 1901.—Further Descriptions of the Tertiary Polyzoa of Victoria. Part V. *Proc. Roy. Soc. Vict.,* vol. xiii., pt. ii., pp. 183-190, pls. xxiii., xxiv.

———, 1903.—Further Descriptions of the Tertiary Polyzoa of Victoria. Part IX. *Proc. Roy. Soc. Vict.,* vol. xvi. (New Series), pt. i., pp. 140-147, pls. xvi. and xvii.

May, W. L., 1921.—A Check List of the Mollusca of Tasmania, pp. 1-114.

———, 1923.—Illustrated Index of Tasmanian Shells, pp. 1-100, pls. i.-xlvii.

Molina, —, 1788.—Hist. Nat. Chile, vol. i.

d'Orbigny, A D., 1826.—Tableau Méthodique de la classe des Céphalopodes.—*Annales des Sciences Naturelles,* vol. vii., pp. 245-314, pls. x-xvii.

Pilsbry, H. A., 1916.—The Sessile Barnacles (Cirripedia) contained in the Collections of the U. S. National Museum, including a Monograph of the American Species. U.S. Nat. Mus., Bull. 93, pp. 1-366, pls. i.-lxxvi.

Pritchard, G. B., 1901.—Contributions to the Palaeontology of the Older Tertiary of Victoria. *Proc. Roy. Soc. Vict.,* vol. xiv., pt. i., pp. 22-31, pls. ii. and iii.

Smith, E. A., 1885.—"Challenger" Reports, vol. xiii. Report on the Lamellibranchiata.

Tate, R., 1886.—The Lamellibranchs of the Older Tertiary of Australia (Part I.). *Trans. Roy. Soc. S. Aust.,* vol. viii., pp. 96-158, pls. ii-xii.

———, 1887.—The Lamellibranchs of the Older Tertiary of Australia (Part II.). *Trans. Roy. Soc. S. Aust.,* vol. ix., pp. 142-189, pls. xiv.-xx.

———, 1898.—On some Recent and Fossil Australasian Species of *Philobryae. Trans. Roy. Soc. S. Aust.,* vol. xxii., pp. 86-89, pl. iv.

———, 1899.—A Revision of the Older Tertiary Mollusca of Australia. Part I. *Trans. Roy. Soc. S. Aust.,* vol. xxiii., pp. 249-277, pl. i.-xiii.

———, 1899.—A Revision of the Australian *Cyclostrematidae* and *Liotiidae*. *Trans. Roy. Soc. S. Aust.,* vol. xxiii., pp. 213-248, pls. vi., vii.

Tate, R. and May, W. L., 1900.—Descriptions of New Genera and Species of Australian Mollusca (chiefly Tasmania). *Trans. Roy. Soc. S. Aust.,* vol. xxiv., pt. ii., pp. 90-103.

Tate, R., and May, W. L., 1901.—A Revised Census of the Marine Mollusca of Tasmania. *Proc. Linn. Soc., N.S.W.,* vol. xxvi., pp. 344-471, pls. xxiii.-xxvii.

Withers, T. H., 1913.—Some Miocene Cirripedes of the Genera *Hexelasma* and *Scalpellum* from New Zealand. *Proc. Zool. Soc. Lond.,* pp. 840-854, pls. lxxxv.-lxxxvi.

———, 1924.—The Fossil Cirripedes of New Zealand. *Geol. Surv. N. Z. Pal. Bull.,* No. 10, pp. 1-47, pls. i.-viii.

Woods, T., 1877.—Notes on the Fossils referred to in the Foregoing Paper (i.e., Johnston, 1877). *Pap. Roy. Soc. Tas.* for 1876, pp. 91-116.

———, 1879.—On Some Tertiary Fossils. *Proc. Linn. Soc. N.S.W.,* vol. iv., pt. i., pp. 1-20, pls. i.-iii.; pl. iv. (pars.).

VII.—EXPLANATION OF PLATES.

I.

Fig. 1.—*Spiroloculina dispansa* Chapman and Crespin. Holotype. Lateral aspect. 660 feet. × 23.

Fig. 2.—*Frondicularia nuda* Chapm. and Cresp. Holotype. Lateral aspect. 1,088 feet. × 25.

Fig. 3.—*Cristellaria elongata* d'Orb. Plesiotype. Lateral aspect. 1,667 feet. × 34.

Fig. 4.—*Amphiblestrum ctenostoma* Chapm. and Cresp. Holotype. 1,025 feet. *a*, × 19; *b*, × 38.

Fig. 5.—*Amphiblestrum spathuloides* Chapm. and Cresp. Holotype. 1,658 feet. × 26.

II.

Fig. 6.—*Truncatulina mundula* Brady, Parker, and Jones, var. *carinata* Chapm. and Cresp. Holotype of variety, superior aspect. 1,220 feet. × 37.

Fig. 7.—*Parasmilia lucens* Dennant. Plesiotype. 902 feet. × 6.

Fig. 8.—*Graphularia kalimnae* Chapm. and Cresp. *a*, lateral aspect of axis; *b*, fractured end of axis; *c*, longitudinal fracture of axis, showing dense central core and dark carbonized fleshy cortex. Holotype. 605 feet. × 3.

Fig. 9.—*Melicerita sorrentae* Chapm. and Cresp. *a*, zooecial surface, × 10; *b*, zooecia more highly magnified, × 30. Holotype 1,360 feet.

Fig. 10.—*Malleia planidorsata* Chapm. and Cresp. *a*, ventral valve; *b*, dorsal valve. Holotype. 618 feet. × 12.

III.

Fig. 11.—*Cellepora stellata* Maplestone. Plesiotype. 1,204 feet. × 18.

Fig. 12.—*Arca* (*Barbatia*) *microïndula* Chapm. and Cresp. *a*, right valve, × 8; *b*, magnified ornament, × 20. Holotype. 623 feet.

Fig. 13.—*Arca* (*Barbatia*) *dissimulina* Chapm. and Cresp. *a*, left valve, × 8; *b*, magnified ornament on posterior angle, × 20. Holotype. 670 feet.

Fig. 14.—*Limopsis affinitalis* Chapm. and Cresp. *a*, left valve, X 5; *b*, ornament magnified, × 13. Holotype. 719 feet.

Fig. 15.—*Lissarca cincturata* Chapm. and Cresp. *a*, left valve, × 18; *b*, cardinal area, interior of valve, × 18; *c*, ornament magnified, × 72. Holotype. 1,107 feet.

IV.

Fig. 16.—*Philobrya bernardi* Tate. Right valve. Plesiotype. 1,107 feet. × 20.

Fig. 17.—*Modiolus lineus* Hedley sp. Left valve. Plesiotype. 741 feet. × 20.

Fig. 18.—*Myodora gabrieli* Chapm. and Cresp. *a*, right valve; *b*, left valve; *c*, cardinal area of right valve; *d*, cardinal area of left valve. Holotype. 670 feet. × 6.

Fig. 19.—*Nuculana fortis* Hedley sp. Plesiotype. 1,107 feet. × 18.

V.

Fig 20.—*Cuspidaria vellicata* Chapm. and Cresp. Right valve. Holotype. 605 feet. × 20.
Fig. 21.—*Venericardia subcompacta* Chapm. and Cresp. Right valve. Holotype. 605 feet. × 20.
Fig. 22.—*Neolepton novacambricum* Hedley. *a,* right valve; *b,* cardinal area, right valve. Plesiotype. 1,160 feet. × 24.
Fig. 23.—*Sarepta planiuscula* Tate sp. Right valve. Plesiotype. 1,107 feet. × 18.
Fig. 24.—*Propeleda ensicula* Angas sp. Left valve. Plesiotype. 605 feet. × 10.
Fig. 25.—*Katelysia multistrigosa* Chapm. and Cresp. Left valve. Holotype. 605 feet. × 20.

VI.

Fig. 26.—*Antigona dennanti* Chapm. and Cresp. *a,* right valve; *b,* interior of right valve. Plesiotype. 660 feet. × 2.
Fig. 27.—*Clausinella shelfordensis* Chapm. and Cresp. Right valve. Holotype. Shelford (Dennant coll.). × 8.
Fig. 28.—*Dentalium semiaratum* Chapm. and Cresp. Holotype. 719 feet. × 18.
Fig. 29.—*Liotella capitata* Hedley sp. Plesiotype. 741 feet. × 30.
Fig 30.—*Brookula singletoni* Chapm. and Cresp. Holotype. *a,* oral view; *b,* side view. 1,461 feet. × 20.
Fig. 31.—*Teinostoma calva* Chapm. and Cresp. Holotype. *a,* apical view; b, basal view. 1,180 feet. × 14.

VII.

Fig. 32.—*Cyclostrema cornuspira* Chapm. and Cresp. *a,* apical aspect; *b,* basal aspect. Holotype. 1,150 feet. × 28.
Fig. 33.—*Eulima bicurvata* Chapm. and Cresp. Holotype. 990 feet. × 10.
Fig. 34.—*Turbonilla mulderi* Chapm. and Cresp. Holotype. 1,465 feet. × 10.
Fig. 35.—*Turbonilla radicans* Chapm. and Cresp. Holotype. 670 feet. × 11.
Fig. 36.—*Turbonilla constricta* Chapm. and Cresp. Holotype. 976 feet. × 20.
Fig. 37.—*Turbonilla tenuissima* Hedley. Plesiotype. 1,050 feet. × 20.
Fig. 38.—*Odostomia deplexa* Tate and May sp. Plesiotype. 1,560 feet. × 10.
Fig. 39.—*Eulimella nitidula* Chapm. and Cresp. Holotype. Mitchell River (Janjukian). Dennant coll. × 10.
Fig. 40.—*Mathilda decorata* Hedley. Plesiotype, 1,025 feet. × 10.
Fig. 41.—*Epitonium crebrelamellatum* Tate sp. Plesiotype. 1,158 feet. × 10.
Fig. 42.—*Natica gatliffi* Chapm. and Cresp. *a,* apical aspect; *b,* umbilical aspect. Holotype. 1,107 feet. × 10.
Fig. 43.—*Haurakia gabrieli* Chapm. and Cresp. Holotype. 1,446 feet. × 20.

VIII.

Fig. 44.—*Rissoina stevensiana* T. Woods. Plesiotype. Table Cape (Janjukian). Dennant coll. × 7.

Fig. 45.—*Turritella acinella* Chapm. and Cresp. Holotype. 1,310 feet. × 10.

Fig. 46.—*Turritella multicincturalis* Chapm. and Cresp. Holotype. 741 feet. × 10.

Fig. 47.—*Turritella medioplicatilis* Chapm. and Cresp. Holotype. 1,461 feet. × 10.

Fig. 48.—*Cerithiella trigemmata* Chapm. and Cresp. Holotype. Mitchell River (Janjukian). Dennant coll. × 10.

Fig. 49.—*Bittium turritelliforme* Angas sp. Plesiotype. 623 feet. × 12.

Fig. 50.—*Cerithiopsis reticosa* Chapm. and Cresp. Holotype. 1,461 feet. × 20.

Fig. 51.—*Cerithiopsis mitchellensis* Chapm. and Cresp. Holotype. Mitchell River (Janjukian). Dennant coll. × 10.

Fig. 52.—*Ataxocerithium serotinoides* Chapm. and Cresp. Holotype. 1,090 feet. × 5.

Fig. 53.—*Trophon halli* Chapm. and Cresp. Holotype. 1,107 feet. × $5\frac{1}{2}$.

Fig. 54.—*Trophon profundus* Chapm. and Cresp. Holotype. 1,107 feet. × 10.

IX.

Fig. 55.—*Marginella crassidens* Chapm. and Cresp. Holotype. Gippsland Lakes (Kalimnan). Dennant coll. × 10.

Fig. 56.—*Marginella globiformis* Chapm. and Cresp. Holotype. Mitchell River (Janjukian). Dennant coll. × 10.

Fig. 57.—*Filodrillia steiroides* Chapm. and Cresp. Holotype. Balcombe Bay (Oligocene). Dennant coll. × 10.

Fig. 58.—*Eucithara subglabra* Chapm. and Cresp. Holotype. 850 feet. × 10.

Fig. 59.—*Etrema trophonalis* Chapm. and Cresp. Holotype. 990 feet. × 10.

Fig. 60.—*Etrema praespurca* Chapm. and Cresp. Holotype. 1,107 feet. × 10.

Fig. 61.—*Etrema pseudoelegans* Chapm. and Cresp. Holotype. 1,158 feet. × 10.

Fig. 62.—*Guraleus volutiformis* Chapm. and Cresp. Holotype. 1,058 feet. × 10.

Fig. 63.—*Cythere sorrentae* Chapm. and Cresp. Holotype. *a,* left valve; *b,* edge view. 1,088 feet. × 30.

Fig. 64.—*Cythere caudispinosa* Chapm. and Cresp. Holotype. *a,* left valve; *b,* edge view. 640 feet. × 30.

X.

Fig. 65.—*Cythere baragwanathi* Chapm. and Cresp. Holotype. *a,* right valve; *b,* edge view. 489 feet. × 30.

Fig. 66.—*Bythocythere keblei* Chapm. and Cresp. Holotype. *a,* right valve; *b,* edge view. 623 feet. × 45.

Fig. 67.—*Cytherura praemucronata* Chapm. and Cresp. Holotype. *a,* right valve; *b,* edge view. 1,088 feet. × 45.

Fig. 68.—*Cytherella sulcosa* Chapm. and Cresp. Holotype. *a,* right valve; *b,* edge view. 997 feet. × 45.

Fig. 69.—*Cytherella intermedia* Chapm. and Cresp. Holotype. *a,* right valve; *b,* edge view. 1,088 feet. × 45.

Fig. 70.—*Cytherella araneosa* Chapm. and Cresp. Holotype. *a,* left valve; *b,* edge view. 1,360 feet. × 45.

Fig. 71.—*Scalpellum* (*Arcoscalpellum*) *dunni* Chapm. and Cresp. Holotype (carina). *a,* exterior; *b,* interior. 661 feet. × 10.

Fig. 72.—*Scalpellum* (*?Arcoscalpellum*) *meridianus* Chapm. and Cresp. Holotype (tergum). *a,* exterior; *b,* interior. 1,230 feet. × circ. 10.

XI.

Fig. 73.—*Goniocidaris prunispinosa* Chapm. and Cudmore. *a-g,* Grice's Creek (spines); *h-k,* Balcombe Bay (spines); *l,* Gellibrand River (interamb.). Syntypes. Natural size.

Fig. 74.—*Goniocidaris pentaspinosa* Chapm. and Cudmore. *a-f,* Grice's Creek (spines); *g,* Neumerella (interamb.) Syntypes. Natural size.

Fig. 75.—*Limopsis affinitalis* Chapm. and Cresp. Right valve. Paratype. 741 feet. × 2.

Fig. 76.—*Anomia tatei* Chapm. and Singleton. *a,* exterior of left valve; *b,* interior of left valve. Kalimnan. Grange Burn. Holotype. Coll. Singleton. Natural size.

Fig. 77.—*Cardita sorrentae* Chapm. and Cresp. Left valve. Holotype. 623 feet. × circ. 2.

Fig. 78.—*Cardita sorrentae* Chapm. and Cresp. Right valve. Paratype. 719 feet. × 2.

Fig. 79.—*Venericardia archaenepeanensis* Chapm. and Cresp. Left valve. Holotype. 674 feet. × 2.

Fig. 80.—*Venericardia subcompacta* Chapm. and Cresp. Right valve. Paratype. Gippsland Lakes (Dennant coll.). × 2.

XII.

Fig. 81.—*Protocardia ornithopetronica* Chapm. and Cresp. Right valve. Holotype. Bird Rock, Torquay (Dennant coll.). × circ. 2.

Fig. 82.—*Antigona dennanti* Chapm. and Cresp. Left valve. Holotype. Jemmy's Point, Gippsland Lakes (Dennant coll.). × circ. $1\frac{3}{4}$.

Fig. 83.—*Adeona obliqua* MacGillivray. Zoarium showing the medial fractured surface on bore-core. 1,259 feet. Natural size.

Fig. 84.—*Zenatiopsis angustata* Tate. Right valve, on surface of core. 598 feet. Natural size.

Fig. 85.—*Eutrochus fontinalis* Pritchard. Shell shown on fractured surface of core. 758 feet. × circ. 2.

VIII.—INDEX.

acinella, Turritella 115, 163.
Acknowledgments, 184.
acutus, Balanus (Balanus) amphitrite var. 132, 172, 179.
affinitalis, Limopsis 96, 152.
alata, Loxoconcha 127, 170.
Amphiblestrum ctenostoma, 92, 147.
Amphiblestrum spathuloides, 93, 147.
Annelid Fauna, 175.
Anomia tatei, 99, 155.
Anthozoan Fauna, 175.
Antigona dennanti, 104, 157.
araneosa, Cytherella 130, 171, 179.
Arca (Barbatia) dissimulina, 98, 152.
Arca (Barbatia) microündula, 98, 152.
archaenepeanensis, Venericardia 102, 156.
Ataxocerithium serotinoides, 118, 164.
aurantica, Syrnola aff. 111, 161.
auricula, Cytherella 130, 171.

Balanus (Balanus) amphitrite var. *acutus*, 132, 172, 179.
Balanus (Megabalanus) decorus, 132, 172, 179.
Balanus (Megabalanus) psittacus, 132, 172, 179.
Balcombian, 182.
baragwanathi, Cythere 126, 170, 179.
bernardi, Philobrya 99, 153, 177.
Bibliography, 185, 188.
bicurvata, Eulima 108, 160.
Bittium turritelliforme, 117, 163, 178.
Bore core contents, 7-86.
Bore, position of, 5.
Boring, method of, 5.
Brachiopod Fauna, 176.
Brookula singletoni, 107, 160, 178.
Bythocythere keblei, 127, 171, 179.

calva, Teinostoma 107, 160.
capitata, Liotella 106, 160, 178.
Cardita sorrentae, 101, 156.
carinata, Truncatulina mundula var. 89, 142.
Cellepora stellata, 93, 150.
Cephalopod Fauna, 178.
Cerithiella trigemmatata, 116, 163.
Cerithiopsis mitchellensis, 118, 164, 178.
Cerithiopsis reticosa, 117, 164, 178.
chrysalidus, Epigrus 114, 162, 181.
cincturata, Lissarca 97, 153, 177.
Cirripede Fauna, 179.
Classified list of fossils, 134-172.
Clausinella shelfordensis, 105, 158.
constricta, Turbonilla 109, 160.
cornuspira, Cyclostrema 107, 160.
costata, Marginulina 88, 140.
crassideus, Marginella 120, 165.
crebrelamellatum, Epitonium 112, 161.
Cristellaria elongata, 88, 140.
ctenostoma, Amphiblestrum 92, 147.
Cuspidaria vellicata, 101, 155.
Cytherella araneosa, 130, 171, 179.
Cytherella auricula, 130, 171.
Cytherella intermedia, 129, 171, 179.
Cytherella punctata, 129, 171, 173.
Cytherella sulcosa, 129, 171, 179.
Cyclostrema cornuspira, 107, 160.
Cythere baragwanathi, 126, 170, 179.
Cythere lactea, 124, 169, 179.
Cythere laganella, 124, 169.
Cythere militaris, 126, 169.
Cythere polytrema, 125, 170.
Cythere pumila, 125, 170, 179.
Cythere reussi, 126, 170.
Cythere sorrentae, 124, 169, 179.
Cytherura cf. *lilljeborgii*, 128, 171.
Cytherura praemucronata, 128, 171, 179.
Cytheropteron praeantarcticum, 128, 171, 179.

Date of Bore, 5.
decorata, Mathilda 112, 161.
decorus, Balanus (Megabalanus) 132, 172, 179.
Dentalium semiaratum, 105, 159.
dennanti, Antigona 104, 157.
deplexa, Odostomia 110, 161, 178.
Description of new or rare species, 87-133.
dispansa, Spiroloculina 87, 134, 173.
dissimulina, Arca (Barbatia) 98, 152.
dunni, Scalpellum (Arcoscalpellum) 131, 172, 179.

Echinoderma Fauna, 175.
elongata, Cristellaria 88, 140.
ensicula, Propeleda 96, 151.
Epigrus chrysalidus, 114, 162, 181.
Epigrus variciferus, 113, 162.
Epitonium crebrelamellatum, 112, 161.
Etrema praespurca, 122, 167.
Etrema pscudoelegans, 123, 167.
Etrema trophonalis, 122, 167.
Eucithara subglabra, 121, 167, 181.
Eulima bicurvata, 108, 160.
Eulimella nitidula, 111, 161, 178.

Filodrillia steiroides, 121, 166.
Fish Fauna, 179.
Fish otoliths, 133, 172, 179.
foutinalis, Nuculana 94, 96, 151, 177.
Foraminiferal Fauna, 173.
fortis, Nuculana 95, 151, 177.
Frondiculavia nuda, 87, 139.

gabrieli Haurakia 113, 162, 178.
gabrieli, Myodora 100, 155.
Gasteropod Fauna, 178.
gatliffi, Natica 112, 162.
globiformis, Marginella 120, 165.
Goniocidaris pentaspinosa, 91, 146, 175.
Goniocidaris prunispinosa, 90, 146, 175.
Graphularia kalimnnae, 90, 145, 175, 180.
Guraleus volutiformis, 123, 167.

halli, Trophon 119, 164, 178.
Haurākia gabrieli, 113, 162, 178.
Holocene, 179.

intermedia, Cytherella 129, 171, 179.

Janjukian, 181.
jonesiana, Pyramidella 110, 161, 173.

Kalimnan, 180.
kalimnae, Graphularia 90, 145, 175, 180.
Katelysia multistrigosa, 105, 157, 176.
keblei, Bythocythere 127, 171, 179.

lactea, Cythere 124, 169, 179.
languanella, Cythère 124, 169.
lilljeborgii, Cytherura, cf. 128, 171.
Limopsis affinitalis, 96, 152.
lineus, Modiolns 100, 155, 177, 181.
lintea, Rissoina 114, 162, 173, 178.
Liotella capitata, 106, 160, 178.
Lissarca cincturata, 97, 153, 177.
Loxoconcha alata, 127, 170.
lucens, Parasmilia 89, 145, 175.

Malleia planidorsata, 93, 150.
Mathilda decorata, 112, 161.
Marginella crassidens, 120, 165.
Marginella globiformis, 120, 165.
Marginulina costata, 88, 140.
medioplicatilis, Turritella 116, 163, 178.
Melicerita sorrentae, 92, 147.
meridianus, Scalpellum (? *Arcoscalpellum*), 131, 172, 179.
Method of boring, 5.
microündula, Arca (Barbatia) 98, 152.
militaris, Cythere 126, 169.
mitchellensis, Cerithiopsis 118, 164, 178.
Modiolus lineus, 100, 155, 177, 181.
mulderi, Turbonilla 108, 160, 178.
multicincturalis, Turritella 116, 163.
multistrigosa, Katelysia 105, 157, 176.
mundula, Truncatulina 88, 142.
Myodora gabrieli, 100, 155.

Natica gatliffi, 112, 162.
Neolepton novacambricum, 103, 157, 177.
New Species, List of, 183-4.
nitidula, Eulimella 111, 161, 178.
Notes on Faunas, 173-179.
Notogibbula sp., 106, 160.
novacambricum, Neolepton 103, 157, 177.
Nucnlana fontinalis, 94, 96, 151, 177.
Nuculana fortis, 95, 151, 177.
nuda, Frondicularia 87, 139.

Odostomia deplexa, 110, 161, 178.
ornithopetronica, Protocardia 103, 157, 177.
Ostracoda Fauna, 179.
Otoliths of Fishes, 133, 172, 179.

Parasmilia lucens, 89, 145, 175.
Pelecypod Fauna, 176.
pentaspinosa, Goniocidaris 91, 146, 175.
Philobrya bernardi 99, 153, 177.
planidorsata, Malleia 93, 150.
planiuscula, Sarepta 96, 152, 177.
Pleistocene, 180.
polita, Pyramidella 111, 161.
Polyplacophora Fauna, 177.
polytrema, Cythere 125, 170.
Polyzoal Fauna, 176.
Position of Bore, 5.
praeantarcticum, Cytheropteron 128, 171, 179.
praemucronata, Cytherura 128, 171, 179.
praespurca, Etrema 122, 167.
profundus, Trophon 119, 164, 178.
Propeleda ensicula, 96, 151.
Protocardia ornithopetronica, 103, 157, 177.
prunispinosa, Goniocidaris 90, 146, 175.
pseudoelegans, Etrema 123, 167.
psittacus, Balanus (Megabalanus) 132, 172, 179.
pumila, Cythere 125, 170, 179.
punctata, Cytherella 129, 171, 173.
Pyramidella jonesiana, 110, 161, 173.
Pyramidella polita, 111, 161.

radicans, Turbonilla 109, 160.
reticosa, Cerithiopsis 117, 164, 178.
renssi, Cythere 126, 170.
Rissoina lintea, 114, 162, 173.
Rissoina stevensiana, 114, 162, 178.

Sarepta planiuscula, 96, 152, 177.
Scalpellum (Arcoscalpellum) dunni, 131, 172, 179.
Scalpellum (?Arcoscalpellum) meridianus, 131, 172, 179.
Scaphopoda Fauna, 177.
semiaratum, Dentalium 105, 159.
serotinoides, Ataxocerithum 118, 164.
shelfordensis, Clausinella 105, 158.
singletoni, Brookula 107, 160, 178.
sorrentae, Cardita 101, 156.
sorrentae, Cythere 124, 169, 179.
sorrentae, Melicerita 92, 147.
spathuloides, Amphiblestrum 93, 147.
Spiroloculina dispansa, 87, 134, 173.
steiroides, Filodrillia 121, 166.
stellata, Cellepora 93, 150.
stevensiana, Rissoina 114, 162, 178.
Stratigraphical horizons, 179-182.
subcompacta, Venericardia 102, 156.
sulcosa, Cytherella 129, 171, 179.
Syrnola aff. *aurantica,* 111, 161.
Syrnola tincta, 111, 161.

tatei, Anomia 99, 155.
Teinostoma calva, 107, 160.
tenuissima, Turbonilla 109, 161.
tincta, Syrnola 111, 161.
trigemmata, Cerithiella 116, 163.
Trophon halli, 119, 164, 178.
Trophon profundus, 119, 164, 178.
trophonalis, Etrema 122, 167.
Truncatulina mundula, 88, 142.
Truncatulina mundula var. *carinata,* 89, 142.
Turbonilla constricta, 109, 160.

Turbonilla mulderi, 108, 160, 178.
Turbonilla radicans, 109, 160.
Turbonilla tenuissima, 109, 161.
Turritella acinella, 115, 163.
Turritella medioplicatilis, 116, 163, 178.
Turritella multicincturalis, 116, 163.
turritelliforme, Bittium 117, 163, 178.

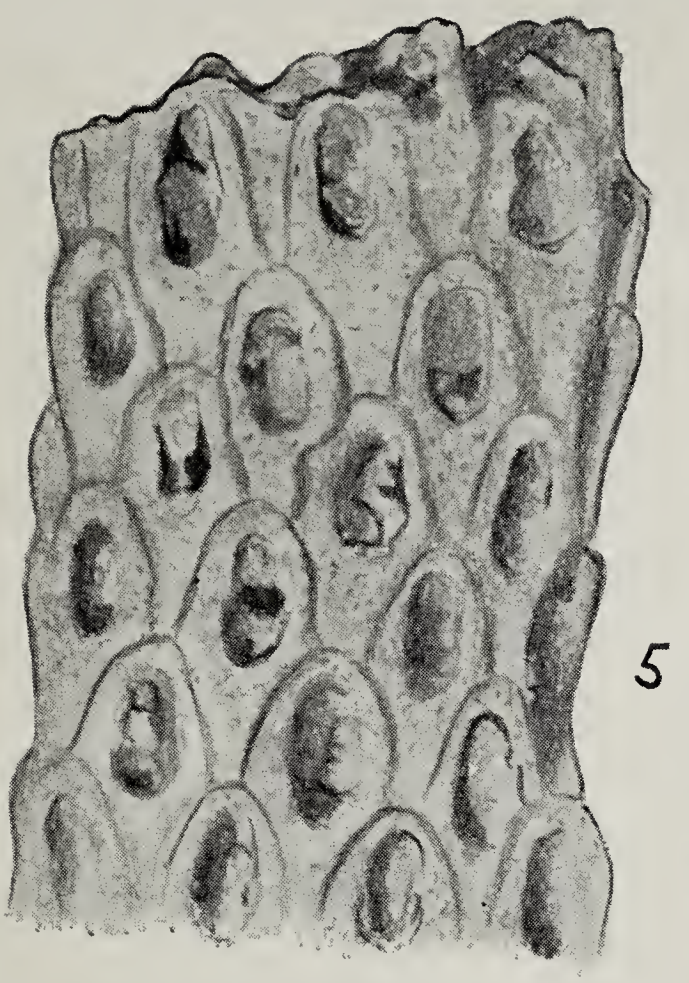
Upper Miocene, 181.

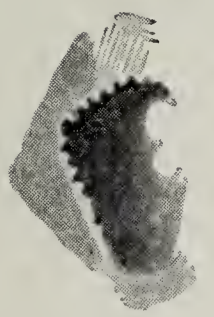
variciferus, Epigrus 113, 162.
vellicata, Cuspidaria 101.
Venericardia archaenepeanensis, 102, 156.
Venericardia subcompacta, 102, 156.
volutiformis, Guraleus 123, 167.

Werrikooian, 180.

THE LIBRARY OF THE
JUN 5 1929
UNIVERSITY OF ILLINOIS

By Authority: H. J. Green, Government Printer, Melbourne.





Winifred Chapman del.

6

7

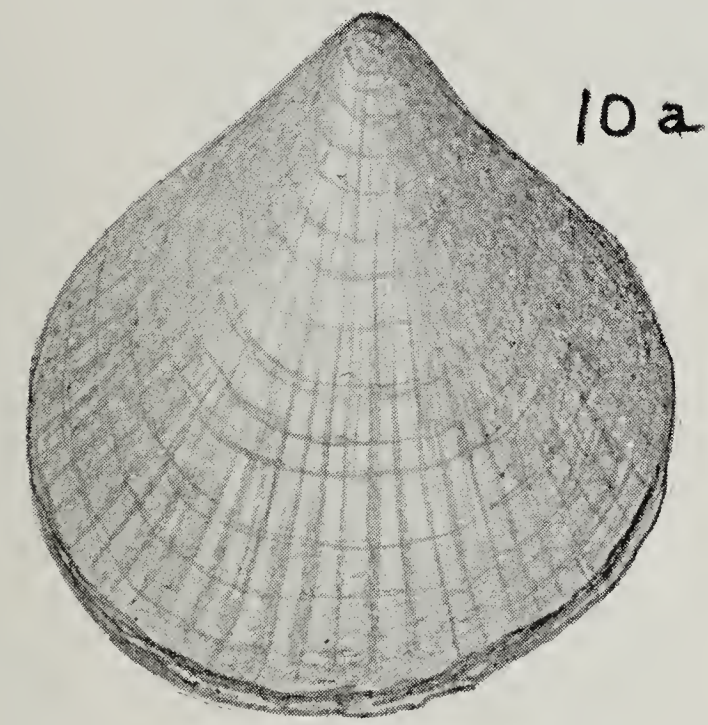
a

b

c

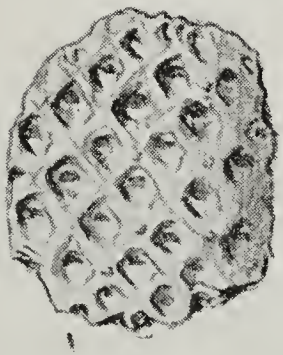
8

10 a

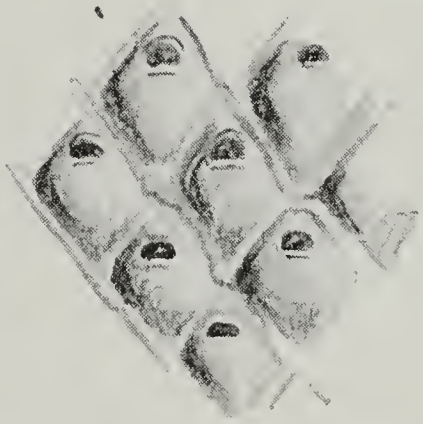


9

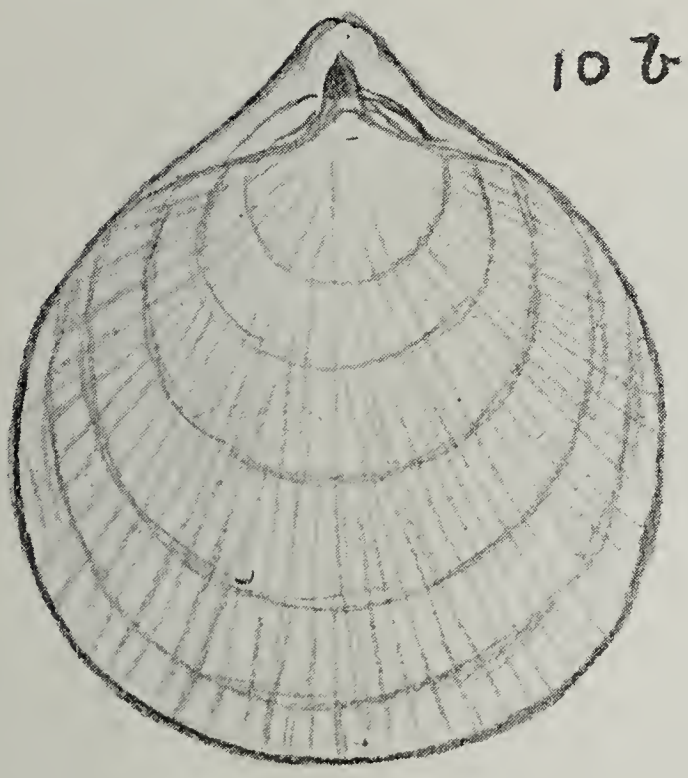
a



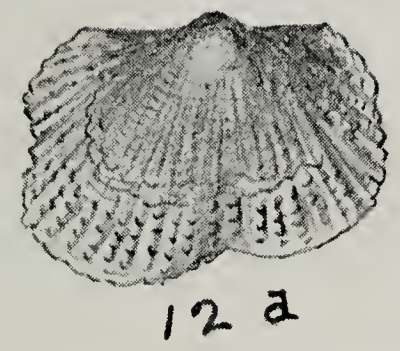
b

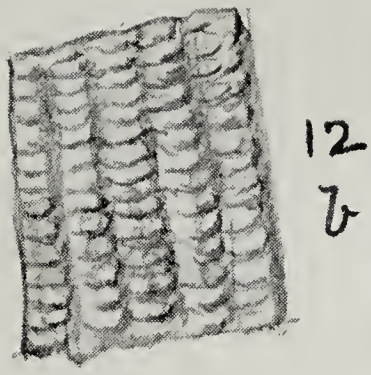


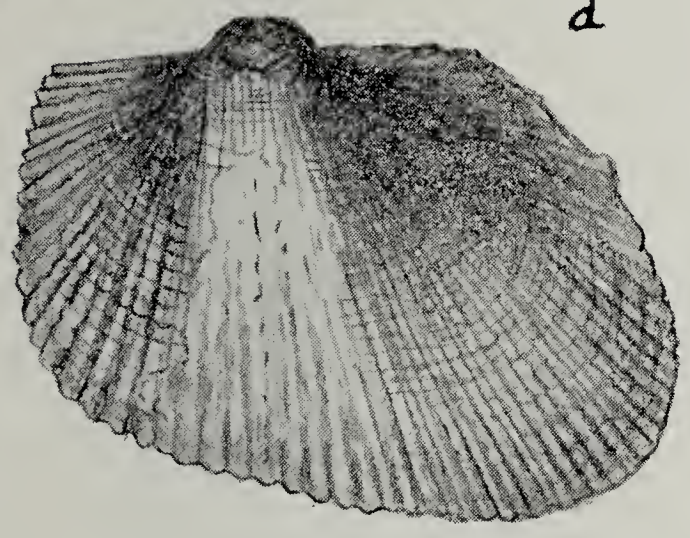
10 b

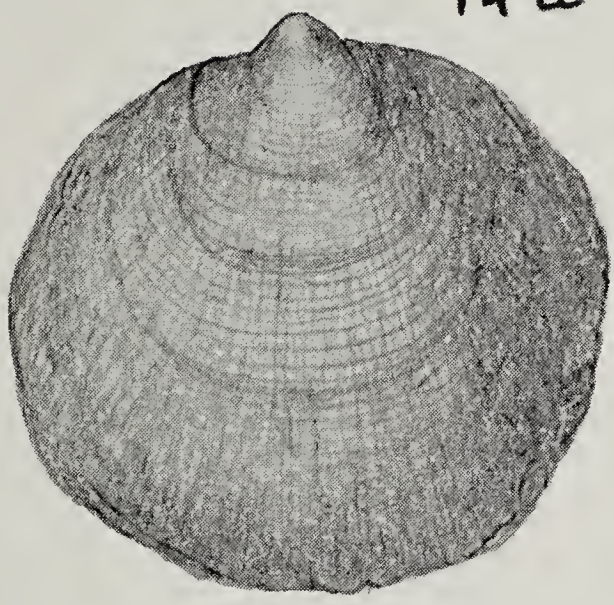


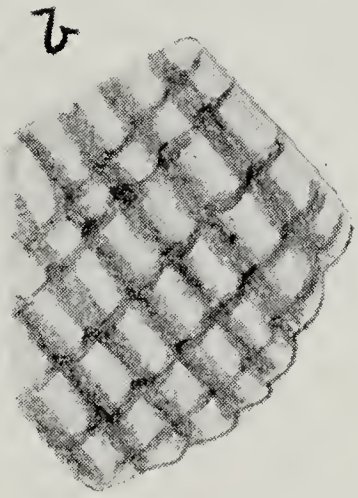
F.C. del.

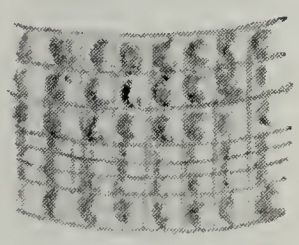


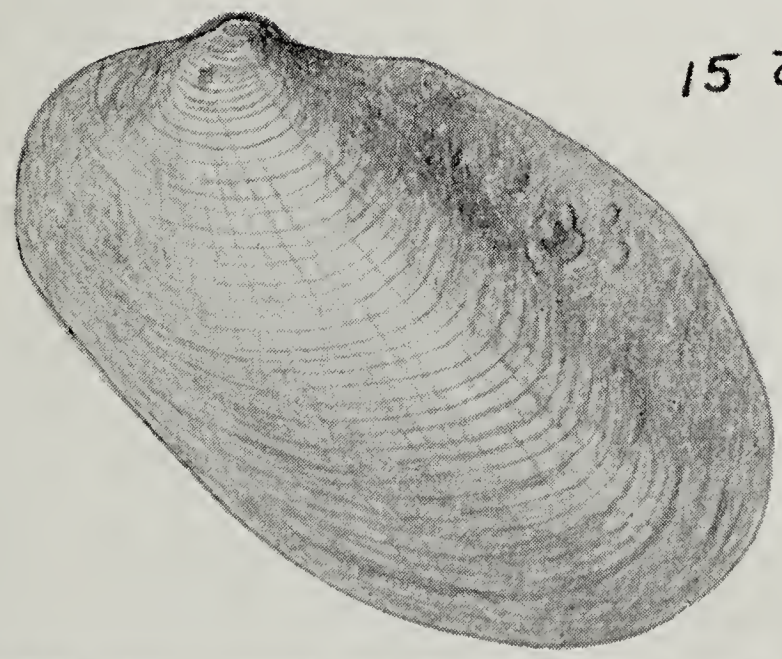




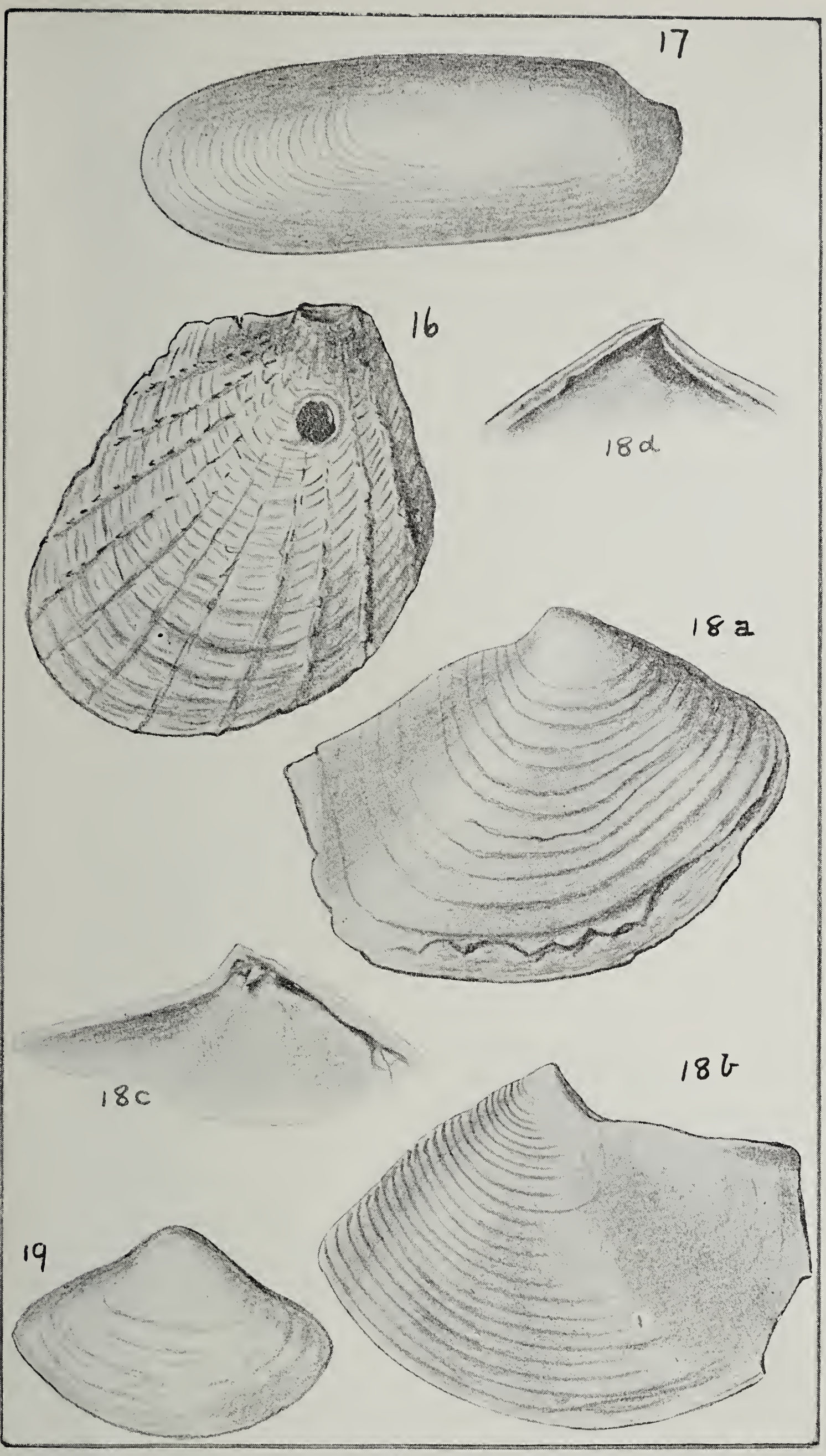




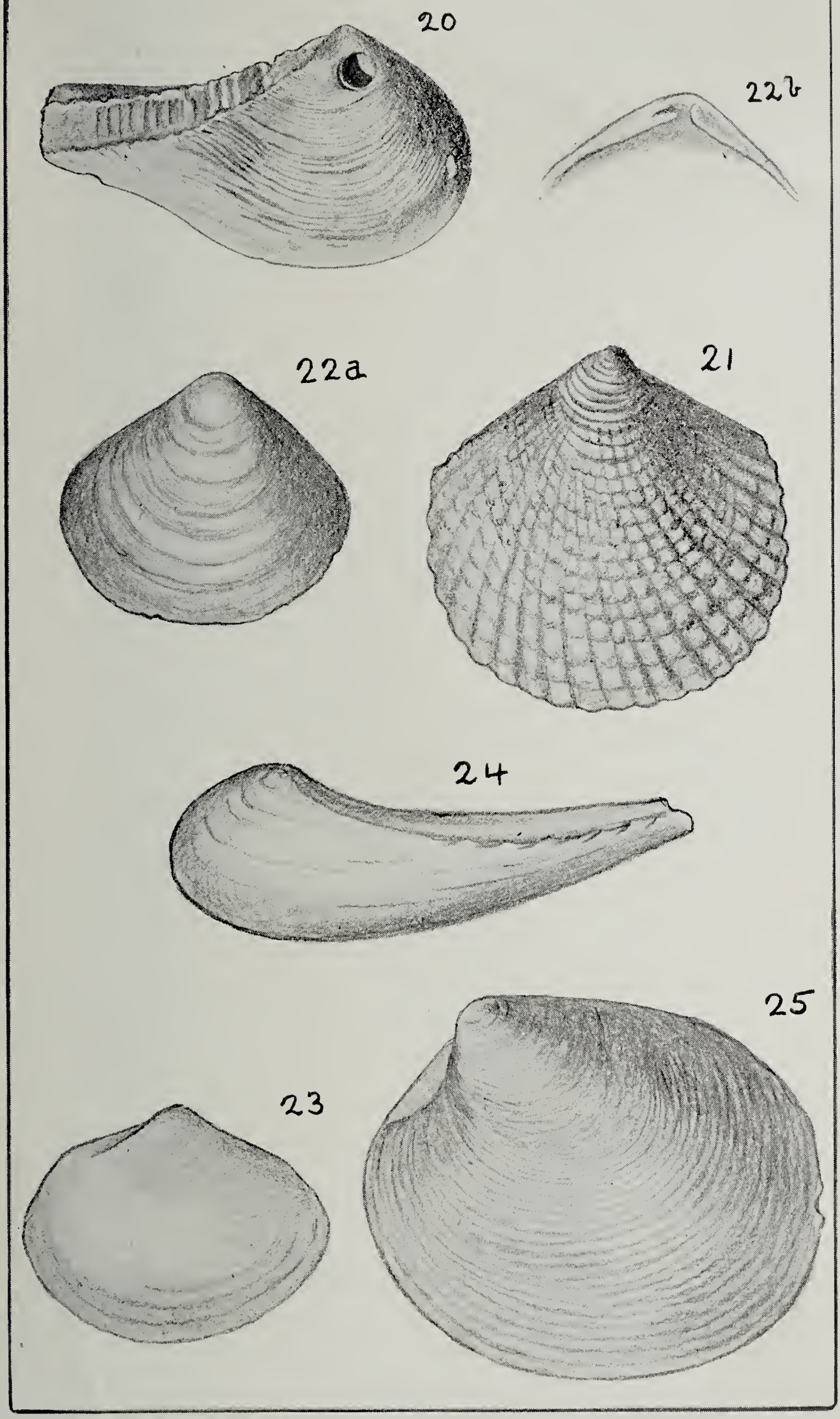




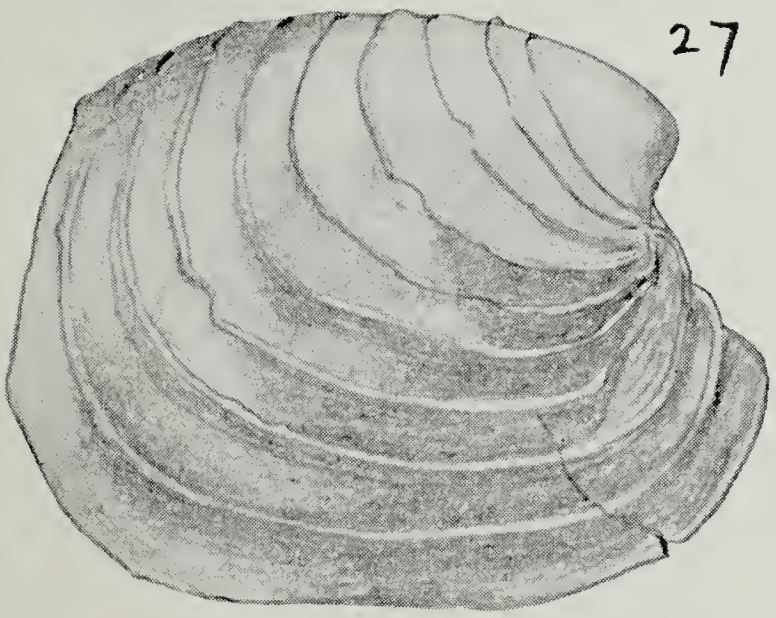
Winifred Chapman del.



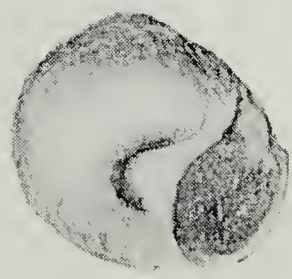
Winifred Chapman del.



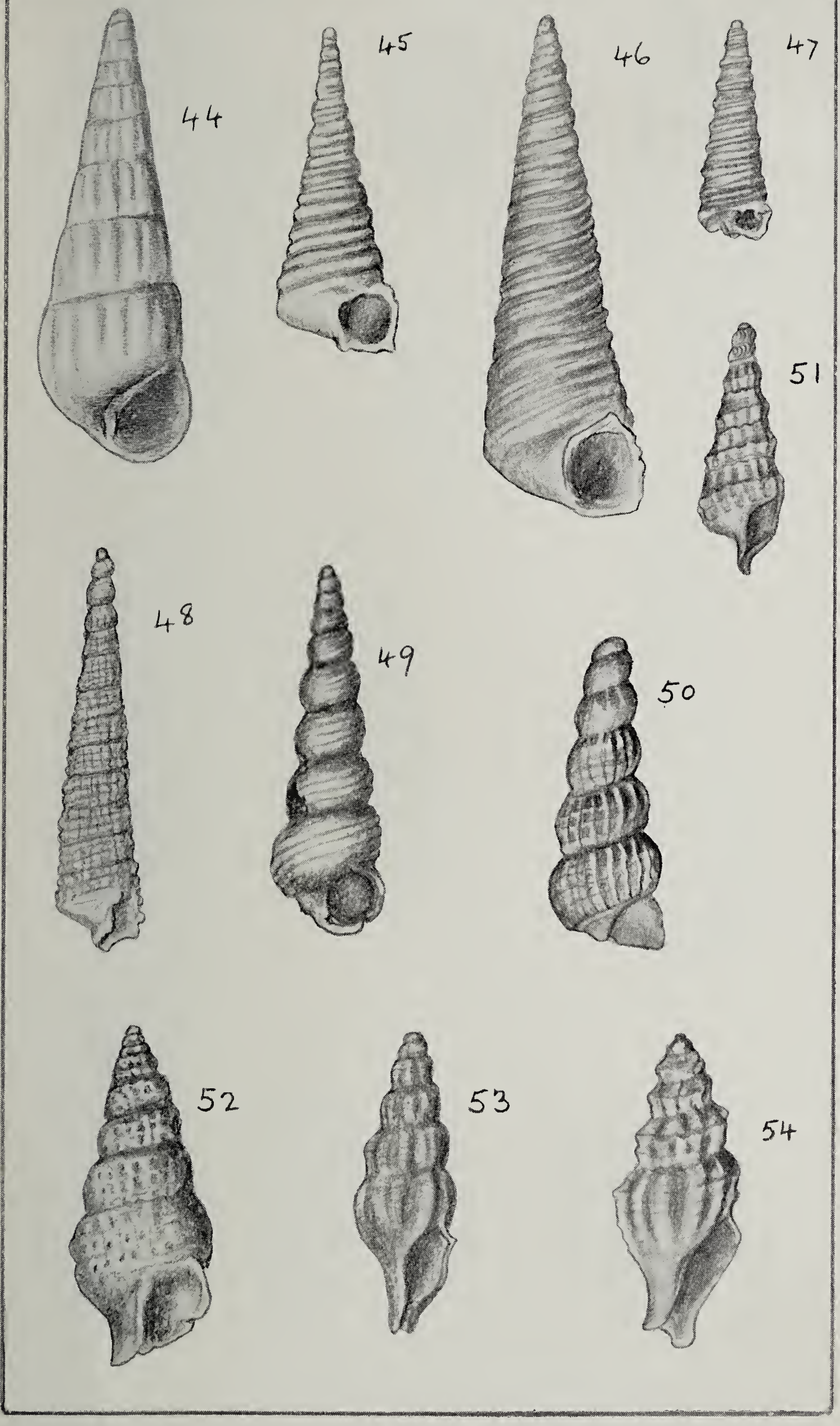
Winifred Chapman del.



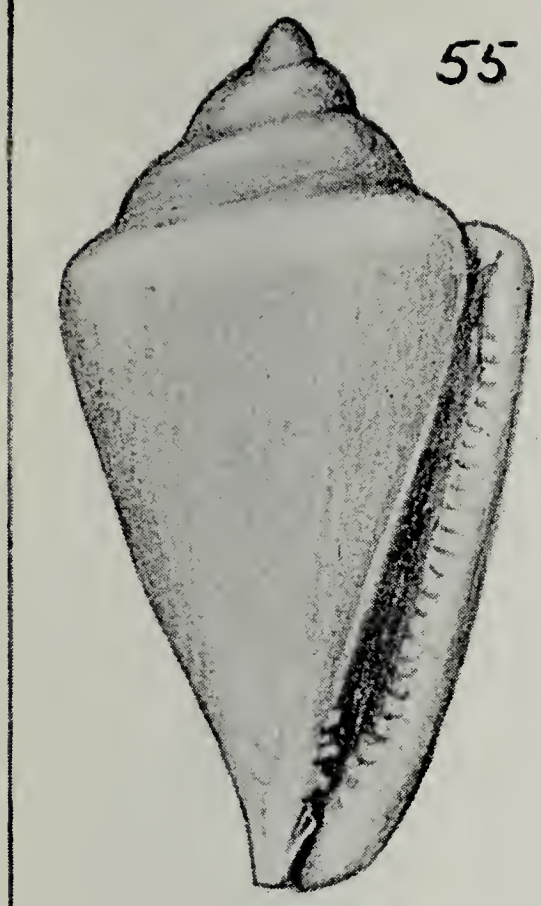
Winifred Chapman del.



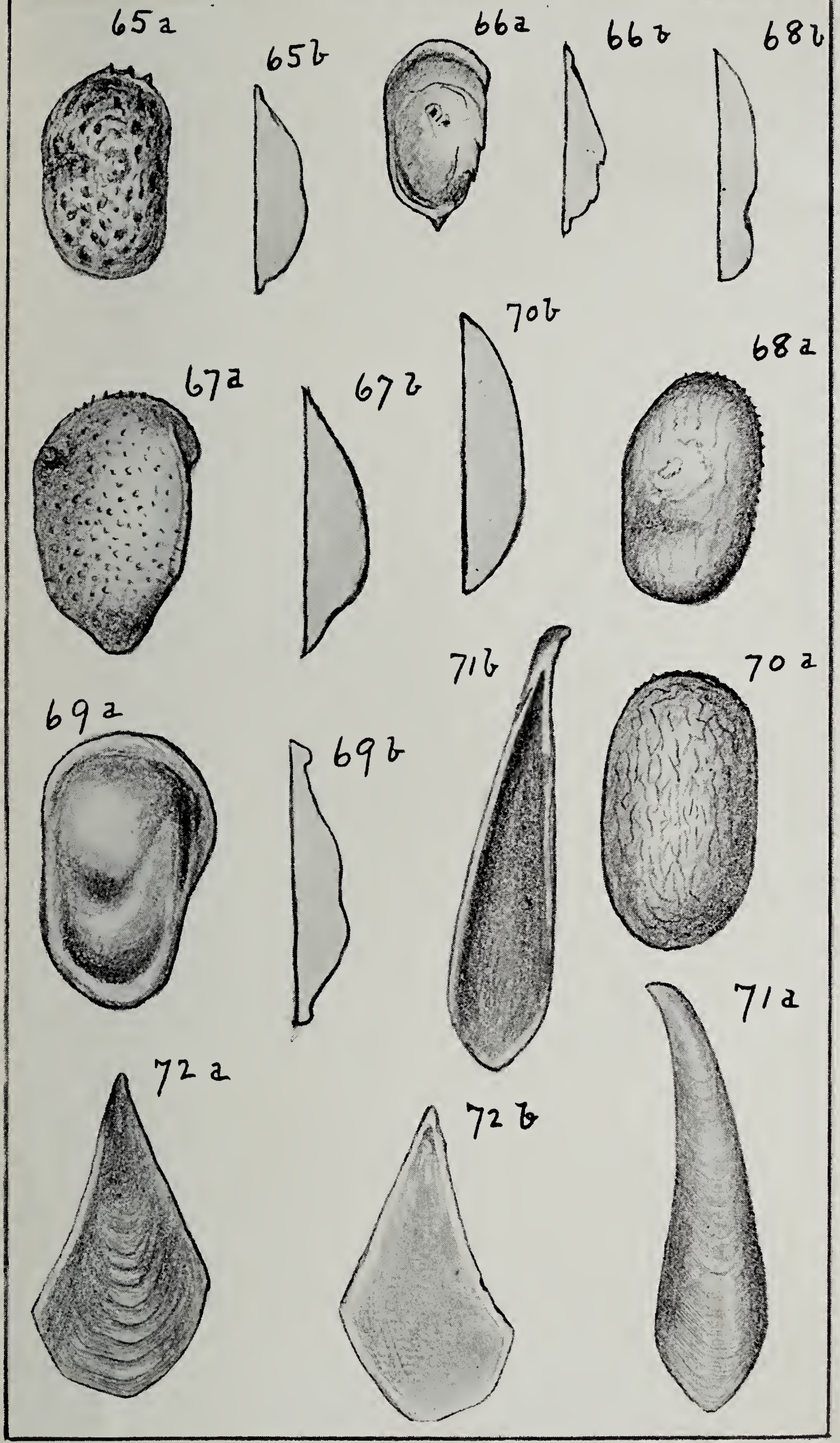
Winifred Chapman del.



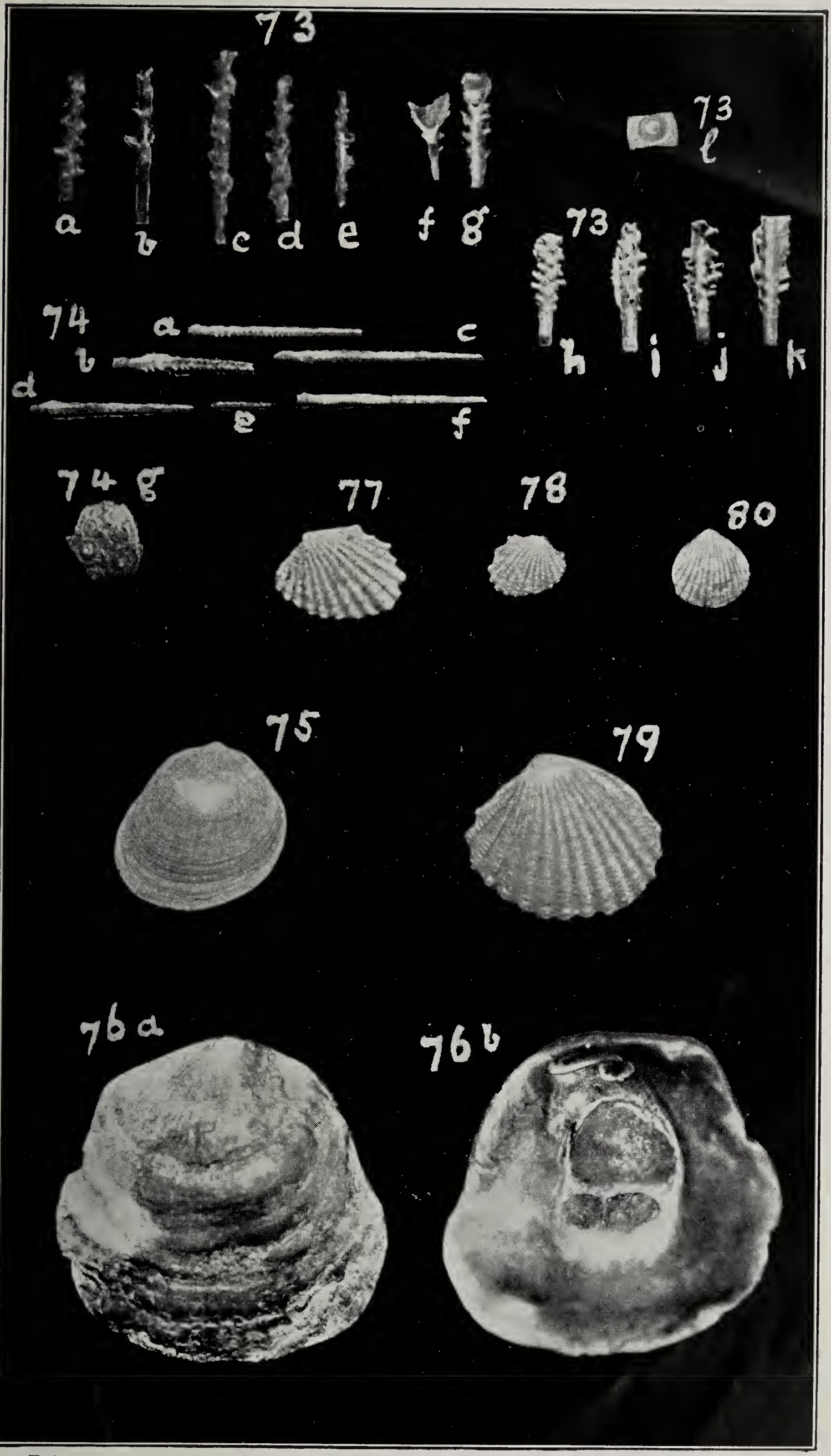
Winifred Chapman del.



W.M.C. and F.C. del.

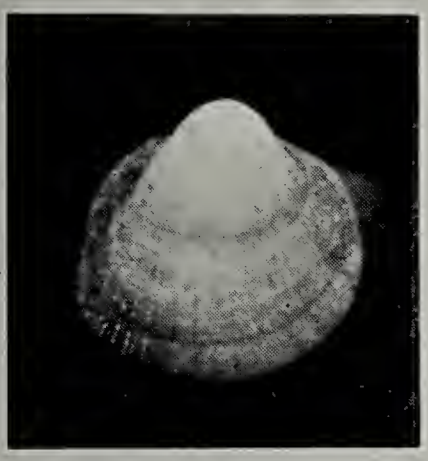


F.C. and W.M.C. del.



F.C. photo.

81

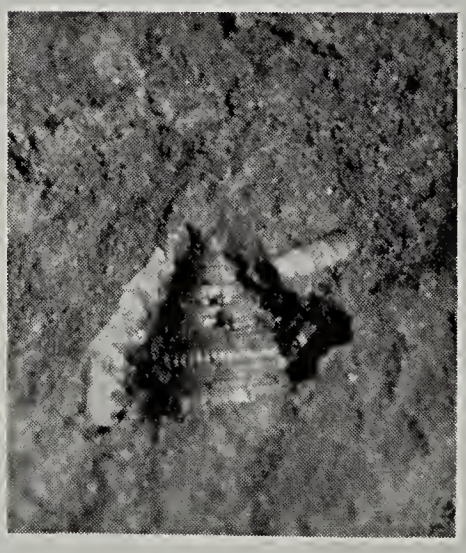


82

83

84

85



F.C. photo.

3 0112 058558658
3 0112 121521253